ASTM BULLETIN

260 SOUTH BROAD STREET PHILADELPHIA, PA.

"Promotion of Knowledge of Materials of Engineering and Standardization of Specifications and Methods of Testing"

TELEPHONE—PENnypacker 3545 CABLE ADDRESS—TESTING

Number 92 May, 1938

Forty-first Annual Meeting, June 27 to July 1

Seventeen Sessions at Atlantic City

CAREFUL study of the large number of technical papers and reports to be presented at the Forty-first Annual Meeting to be held at Chalfonte-Haddon Hall, Atlantic City, from June 27 to July 1 inclusive, has resulted in the arranging of seventeen technical sessions. This number of sessions should provide adequate time for the authors and committee chairmen and also for those who will present written and oral discussion of the numerous items.

It will be noted from the Provisional Program which appears in this BULLETIN that the opening session is scheduled for Tuesday morning, June 28, at 10:30 o'clock. This is to be featured by the annual address of the President, Dr. A. E. White. By providing for evening sessions on three days, it is possible to close the meeting Friday noon.

The technical sessions will be held in the Vernon Room at the ocean end of the Lounge Floor and the Rutland Room on the first floor just above the Lounge. As in the case of recent annual meetings held at Chalfonte-Haddon Hall, the A.S.T.M. registration desk will be located in the Lounge Floor Parlors one floor above the hotel lobby. These arrangements have proved very satisfactory previously and provide a compact and convenient set-up.

With no technical sessions on Monday, June 27, this day and evening is available for meetings of the Society committees and additional committee meetings can be held on Thursday afternoon.

The Thirteenth Edgar Marburg Lecture will be delivered on Wednesday afternoon at 4 o'clock by Dr. Albert Sauveur, Professor Emeritus, Harvard University, on the subject, "The Torsion Test." A brief outline of the Lecture and a condensed biographical sketch of Doctor Sauveur appears on page 3. Following the presentation of the Marburg Lecture, the award of the Charles B. Dudley Medal will be made to Robert H. Heyer, Research Laboratories, The American Rolling Mill Co., for his paper on "Analysis of the Brinell Hardness Test" presented at the 1937 annual meeting in New York City. Mr. Heyer's paper was selected by the Dudley Medal Committee as being an outstanding contribution in the field of research.

The attention of the members is especially directed to the Provisional Program in this issue since this is the only place where this Program will appear prior to the meeting. It includes synopses of the various reports and papers that are scheduled for the meeting.

The Annual Golf Tournament will be held on Thursday afternoon. Further details of the tournament which is always a feature of the annual meeting will be sent to members in a special circular at the end of May. In addition to the A.S.T.M. Cup a number of other prizes will be awarded.

IMPACT SYMPOSIUM

The outstanding feature of the meeting from the technical standpoint is the Symposium on Impact Testing. This is being developed in cooperation with the Welding Research Committee of The Engineering Foundation, W. W. Wering, Bell Telephone Laboratories, Inc., Chairman of the Section on Impact Testing of Committee E-1 on Methods of Testing and M. F. Sayre, Professor of Applied Mechanics, Union College, who is representing the Welding Research Committee, are in charge of preparing the symposium. A review of the papers given in the Provisional Program will indicate the particular problems to be discussed.

Considerable interest has been evident in the symposium. One was held previously by the Society

Contents

Forty-first Annual Meeting 1
District Meetings 4
Dividends from Research, by A. E. White 5
Testing Zinc Coatings on Hardware, by L. W. Hopkins 7
Consumer Testing of Finished Textiles, by Nannene Gowdy 9
Crease Resistant Textile Finishes as Consumers View Them, by Ephraim Freedman 13
Permanent Textile Finishes—The Manufacture's Standpoint, by K. H. Barnard 14
Discussion on A.S.T.M. and Fundamental Research 20
Creep Data—Important New Publication 21
Long Time Members 22
Provisional Program—Forty-first Annual Meeting 25
Boiler and Pressure Vessel Codes 36
New Members 40

in 1922 and since that time the impact test has come into very wide usage. In general the symposium is an effort to present an integrated series of papers covering the basic theories underlying impact tests, data on the factors affecting impact, and papers covering the practical application of impact tests to metals, organic plastics and welds. Since there are differences of opinion on the significance and theory of the test, the two sessions devoted to the symposium are expected to be interesting with spirited discussion.

OTHER TECHNICAL FEATURES

Other topics which will be covered include water, particularly problems in connection with boiler feedwater, radiographic testing in which field a new Society committee has recently been organized and the effect of temperature on the properties of metals and fatigue. Several papers and reports are scheduled in the session devoted to these last two topics.

In the field of non-metallic materials, the sessions on concrete and concrete aggregates will be of much interest to the large number of technologists in this field (it will be noted there are two sessions devoted to these subjects). The Report of Committee C-9 on Concrete and Concrete Aggregates includes three appended papers covering important phases of the committee's work.

There are a number of significant papers describing testing methods and testing instruments, and other problems in the fields of petroleum products, bituminous materials, and road materials, and castings, etc., are covered.

PREPRINTS SENT ON REQUEST

In a separate mailing there is being sent to each A.S.T.M. member in good standing a Preprint Request Blank by which he can request a copy of any of the technical papers and reports preprinted in advance of the meeting. This blank should be returned promptly and should be carefully marked, with the signature and mailing address of the member clearly indicated. The Provisional Program will enable members to make a selection of the items desired. Preprints will be forwarded to the members, probably in three installments. *Each member should note that preprints will not be sent unless requested.*

PHOTOGRAPHIC EXHIBIT AT ANNUAL MEETING; MEMBERS INVITED TO ENTER COMPETITION

One of the features of the annual meeting is a photographic exhibit being developed by a special committee headed by Dr. M. F. Skinker of the Brooklyn Edison Co., 55 Johnson St., Brooklyn, N. Y., the other members of which are W. Herriott, Bell Telephone Laboratories, Inc., and G. O. Hiers, National Lead Co. This photographic competition and exhibition, the first held at an A.S.T.M. meeting is being arranged to stimulate the use of photographic presentation in technical papers before the Society and to develop possible sources of suitable illustrations for the BULLETIN.

Chalfonte-Haddon Hall

Boardwalk and Beach

For this first year the photographs will be limited to those relating to testing and for the present metallographic, X-ray, colored and motion pictures will not be included as a part of the contest. A set of rules has been drafted to govern the competition. Two groups of photographs are being developed—first, the purely amateur group in which pictures entered will have been made by the individual himself and a second section to include photographs made by the so-called professional photographers. Several ribbon prizes are to be awarded for the amateur pictures submitted.

Individual members of the Society and members of A.S.T.M. committees, are eligible to enter pictures in this group. Unless several pictures are needed to tell one story, not more than three pictures should be submitted by one individual. In general, these pictures should conform to the style of recognized amateur exhibitions. They should be mounted either on 16 by 20 in. or 11 by 14 in. cards. The prints should be black and white and they should not be smaller than 4 by 5 in. They need not be glossy. Extra glossy copies should be submitted if needed for reproduction. All those intending to send pictures should notify the chairman, Doctor Skinker, before June 1. All pictures should be submitted before June 15, 1938.

It is understood that any photographs submitted for the exhibition can be used for publication in the BULLETIN. The committee also wishes to make it clear that if there is any particular rule that may be a handicap to a good picture the committee in charge will consider any special cases and make adjustments which may be necessary.

CHILDREN'S WEEK

A number of members will be interested to know that Atlantic City is again having its annual Children's Week and that this year the dates extend from June 24 to July 1. In its announcement the Atlantic City Chamber of Commerce points out that "boys and girls everywhere, under twelve, when accompanied by an adult member of their family, registered and staying at least one full day (twenty-four hours) at a cooperating hotel, are invited to be the guests of Atlantic City.

"Hotels, restaurants, piers, sailboats, rolling chairs, swimming pools, theaters, and all the good things we can think of are included in the invitation. Many special events are being planned for the enjoyment of the youthful guests."

In view of the fact that the A.S.T.M. meeting falls during Children's Week, it is expected that many of the members may wish to consider bringing their families with them for all or at least a portion of the meeting. Attendants will be at hand both in Chalfont-Haddon Hall and on the beach to assist in the care of the smaller children. Those desiring further information can write the Children's Week Committee, 1809 Pacific Ave., Atlantic City, N. J.

HOTEL RESERVATION AND ADVANCE REGISTRATION

It is desirable that all members should make their hotel reservations promptly and for this purpose a return blank addressed to the hotel management is being sent to each member. Rooms can be secured on either the American or European plan at the special rates listed on the return blank. Since Chalfonte and Haddon Hall each has its own dining room service, members who wish to dine together should secure accommodations in the same division of the hotel, particularly if they are registered on the American plan.

In order to expedite registration of members as they arrive at the meeting, it is desirable to have as many registration details as possible taken care of in advance and it would be very helpful if members would fill out and mail promptly to A.S.T.M. Headquarters the advance registration card that is being sent.

REGISTRATION PROCEDURE

Members and visitors should register at the A.S.T.M. desk as promptly as possible after their arrival at the hotel. Each member will receive his badge, a copy of the final program, and preprints of any of the papers and reports desired. The customary members' registration fee of $1 will be in effect. Visitors will receive the badge, program and may secure preprints for any two sessions of the meeting. The visitor's fee is $1, but if a complete set of preprints is desired they may be procured by the payment of $1 additional.

Albert Sauveur—Marburg Lecture

THE Thirteenth Edgar Marburg Lecture will be delivered at the 1938 (Forty-first) A.S.T.M. Annual Meeting at Chalfonte-Haddon Hall, Atlantic City, by Dr. Albert Sauveur, Metallurgical Engineer and Professor Emeritus, Harvard University. Doctor Sauveur has selected as the subject of his lecture "The Torsion Test." He will describe in detail a specially built torsion machine and discuss results obtained in the Metallurgical Laboratories at Harvard. Some of the results reported will include torsional testing of various steels at room and elevated temperatures, testing in the blue heat range, reverse twisting, and the twisting of single crystals.

Doctor Sauveur plans to outline the significance of the autographic torque-twist curves and will stress the desirability of a closer study of the possibilities of the torsion test as a routine testing method comparable in usefulness and practicability to the tension test.

Albert Sauveur

For one who is so well known in the materials world it seems somewhat superfluous to give any outline of his activities. Born in Louvain, Belgium, in 1863, he studied at schools in Brussels, Liege, and Massachusetts Institute of Technology, specializing at the latter in mining and metallurgy. After a period of service as chemist at the Pennsylvania Steel Co., in Steelton, and in charge of the Research Laboratories, Illinois Steel Co., in Chicago, and with other steel companies, he became instructor at Harvard. From 1905 to 1924 he was Professor of Metallurgy and until 1935 he was Gordon McKay Professor of Metallurgy and Metallography, becoming Professor Emeritus in 1935.

An outstanding pioneer and renowned throughout the world for his metallurgical developments, particularly in metallography and heat treatment of iron and steel, he has received medals and honors from numerous governments and institutions. A Chevalier of the Legion of Honor of France, Officer of the Order of Leopold of Belgium, and Officer of the Academy of France, he has been awarded the British Iron and Steel Institute Medal, Franklin Institute Elliott Cresson Gold Medal and was the first recipient of the Albert Sauveur Achievement Medal established in his honor by the American Society for Metals. The schools which have conferred upon Doctor Sauveur honorary degrees of Doctor of Science include: Case School of Applied Science (1921), Grenoble (France) University (1924), University of San Marcos (Peru) (1925), and Harvard University (1926). Lehigh University awarded him the degree of Doctor of Engineering in 1926.

He is a member of numerous societies, and honorary memberships have been conferred by numerous technical and scientific groups.

Doctor Sauveur has written some 150 articles and papers dealing with the metallurgy of iron and steel, including the outstanding book on "The Metallography and Heat Treatment of Iron and Steel." He has been affiliated with the Society from its very beginning—was a member of the old International Association for Testing Materials beginning in 1896. He served on the A.S.T.M. Executive Committee from 1913 to 1915, and has been active in various phases of committee work.

The selection of Doctor Sauveur as Marburg Lecturer is a fitting one and members can look forward to a most interesting Lecture. It is significant that he has selected as his subject one in which there has been a conspicuous lack of information in the technical literature.

Meeting of Chicago Members

ABOUT 60 Chicago members of the Society held a dinner meeting on Friday, April 22, to meet the President and Secretary-Treasurer of the Society. D. L. Colwell, Stewart Die-Casting Corp., chairman of the Chicago District Committee, presided at the dinner, which was held in the Chicago Engineers' Club. Mr. Colwell first called on E. R. Young, Climax Molybdenum Co., to tell of the work that the Chicago Membership Committee is doing under his direction. Following this the Secretary-Treasurer told of some of the current work of the Society, mentioning particularly the expansion into new fields that has taken place during the past two years and the importance of securing authoritative data on materials and tests as a basis for the Society's standardization work.

Mr. Colwell then called on President A. E. White for the principal talk of the evening and Doctor White responded with a very interesting address on "Dividends from Research," which appears on the next page.

Major J. de N. Macomb, Inland Steel Co., is vice-chairman of the District Committee, and C. E. Ambelang, Public Service Co. of Northern Illinois, is secretary.

Big Detroit Audience Hears Excellent Papers

A VERY interesting and successful meeting was held at the Detroit-Leland Hotel, Tuesday evening, April 19, under the auspices of the Detroit District Committee—the meeting being in the form of a dinner followed by a technical symposium on "Protecting Metals Against Corrosion." Realizing the widespread interest in the papers comprising this symposium, the District Committee had invited the members of the Detroit Sections of the Society of Automotive Engineers, American Society for Metals, American Chemical Society and American Electro-platers' Society to join our own members on this occasion. There were 215 at the dinner and upwards of 400 at the technical meeting that followed, making this one of the best attended district sessions.

At the conclusion of the dinner W. H. Graves, Packard Motor Car Co., and Chairman of the District Committee, introduced President White and Secretary Warwick, who spoke briefly on certain of the Society's activities. The technical symposium comprised the following four papers:

Corrosion-Resistant Alloys—H. W. Gillett, Metallurgist, Battelle Memorial Institute.

Metallic Coatings—Carl E. Heussner, Materials Engineer, Chrysler Corp.

The Pretreating of Metals—Ralph Wirshing, Research Laboratories Division, General Motors Corp.

Organic Coatings—J. L. McCloud, Metallurgical Chemist, Ford Motor Co.

Doctor Gillett emphasized the necessity of considering corrosion resistance of metals in connection with the environment in which they are to be used. He discussed the importance of the protective film that is formed as a corrosion product on metals. If the conditions are such that the right kind of film cannot be formed, that metal ceases to be resistant to corrosion. In conclusion he stressed the importance of studying the properties of these corrosion films as an aid to the development of corrosion-resistant metals.

A very complete review of the application of metallic coatings to metals was presented by Mr. Heussner including discussion of the various types of coatings and methods of application. His paper contained a great deal of practical information about the application of these coatings, much of which has not previously been available in so convenient a form.

The so-called rust-proofing of metals, was covered in detail by Mr. Wirshing, including parkerizing, bonderizing and other treatments preparatory to the application of protective coatings. He gave a very interesting description of the development and utility of these various processes.

Mr. McCloud presented in a very interesting and thorough manner descriptions of the various types of organic coatings that are applied to metals and submitted much valuable information as to types and compositions of such coatings. He discussed specifically the various types of pigments, liquid vehicles, driers, extenders and inhibitor materials that make up these coatings.

These papers aroused keen interest and contained so much information of both technical and practical value on the protection of metals against corrosion that it is probable the papers will be issued by the Society in a special publication. Members will receive further announcement of this.

T. A. Boyd, General Motors Corp., vice-chairman of the District Committee, arranged the technical program; the secretary, C. H. Fellows, Detroit Edison Co., was in charge of arrangements for the dinner. Other members of the District Committee who took an active part in arranging for the meeting were Martin Castricum, W. C. du Comb and J. C. Fox.

Pittsburgh Meeting and Smoker

ON the evening of March 18 the Pittsburgh District Committee sponsored a Meeting and Smoker, held at the Mellon Institute of Industrial Research, in honor of President A. E. White. Although somewhat of an innovation in A.S.T.M. affairs in Pittsburgh, the smoker was a great success. During the week of March 14, several committees had meetings in progress in Pittsburgh, including Committees C-1 on Cement, C-7 on Lime, C-12 on Mortars for Unit Masonry, and C-15 on Manufactured Masonry Units, and many of the members of these committees attended the Smoker. There was a good attendance of engineering students from the University of Pittsburgh and Carnegie Institute of Technology. About 190 persons were present, of whom some 105 were Society members.

The chief feature of the evening was a talk by Judge Ralph H. Smith of the Allegheny County Court of Common Pleas on "Behaviorism and Crime." Judge Smith pointed out the necessity of considering the individual, his environment and heredity in passing sentence upon a confessed criminal and cited many interesting examples of actual cases.

In addition to Doctor White, Past-President H. S. Vassar and Secretary-Treasurer C. L. Warwick were present. Doctor White outlined some of his early experiences in Pittsburgh and some of the Society accomplishments were mentioned by the Secretary-Treasurer. Following the meeting, those present were divided into small groups and had an opportunity to make an inspection tour of the new Mellon Institute building.

Arrangements for the meeting were in charge of the Pittsburgh District Committee, with Dean Harvey, Westinghouse Electric and Manufacturing Co., *Chairman,* and F. M. Howell, Aluminum Company of America, *Secretary.*

Dividends From Research[1]

By Dr. A. E. White[2]

DOCTOR MILLIKAN, in his *Science and the New Civilization,* tells us that in 1927 the Bishop of Ripon in his sermon on "Science and Modern Living," expressed the thought that we were gaining new scientific knowledge faster than we were developing our abilities to control ourselves, faster than we were exhibiting capacity to be entrusted with these new forces, and hence he suggested that science as a whole take a ten-year holiday. When asked what he meant by a ten-year scientific holiday, he stated that he had in mind a vacation for physics and chemistry and the parts of biology not associated with the improvement of health and the alleviation of suffering.

The question which the bishop raised is proper enough, but the conclusion is faulty. Physics and chemistry cannot take a vacation without turning off the power behind most of the other sciences. The fear of knowledge is as old as the Garden of Eden. Prometheus was chained to a rock and had his liver torn out because he dared bring knowledge from the gods to men. Lavoisier, the father of scientific chemistry, was beheaded in 1794 because his contemporaries held "the Republic has no need of scientists."

Although the guillotine is now out of date as a method of destroying scientists and scientific investigations, all too many business men have applied the ax to their companies' research activities with utter disregard of the consequences.

What a consolation it is to find concerns, and there are many of them, that support research year in and year out, much of it of a fundamental character, with full recognition that their continued growth depends on it. The leaders of these concerns are the ones to whom we can point with pride and the companies in which they are interested are the strong ones in the country.

It is particularly refreshing to find concerns of this type in these days when the administration of industrial activity is much more complicated than it was in the past. The word "complicated" is used advisedly, because, with rates of pay rising, added costs due to the maintenance of Social Security, the lowering of tariffs on many products, the almost vertical increases in taxes, and the material decrease in demand for products which exists at the moment, it is a much more difficult task successfully to carry forward in industry today than it was in almost any previous period in our history. It is interesting to note, in this general connection, that no less a financial authority than Barron has recently recommended the purchase of stocks making chemical products, with an appreciation that one of the basic reasons for this recommendation is the fact that the industry is founded upon and dependent upon research.

SCIENTIFIC AGE

We are, without question, living in a scientific age. How true this is may be appreciated by the fact that within the past sixty years such things as dynamos, electric motors, transformers, rectifiers, storage batteries, incandescent lamps, phonographs, telephones, internal combustion engines, aircraft, steam turbines, wireless telegraphy, radio, mechanical refrigeration, and many other developments have become present-day commonplaces. Each one of the items mentioned is a story in itself; a story of scientific achievement and development. One would not recognize, for instance, the present-day electric light bulb from the standpoint of lumens or cost of operation as the successor of the early carbon filament lamp. Nor would one recognize the high-powered automobile of today as the outgrowth of the single-cylindered, side-cranked engine of thirty years ago.

As was pointed out by former President Hoover in one of his addresses, we are in a world of scientific development and achievement. We must look to science and invention as a potent force to assist in leading us out of the depression in which we now find ourselves; for some vitalizing condition is necessary to serve as a stimulus in overcoming the forces of non-production. The discovery of gold in California served such a purpose in 1849, and the railroad development was a vital factor in overcoming the effects of the 1873 panic. The opening up of new lands in the West by the Government has been a stabilizing force ever since this country was established and particularly from the days of the Civil War to the World War.

We do not now have those lands, at least to the extent and the amount which we had in years past, and, therefore, we cannot look to homesteading to be a potent factor in improving the present-day industrial situation. To be sure, we might enter into reclamation work, because there are millions of acres thus available. This reclamation would provide employment, as well as add extensively to the country's millions of tillable acres. It is questionable, however, if such a procedure at this time is economically wise, because the agricultural interests of the United States are still greatly suffering from the evils of over-production, although this difficulty has, in part at least, been met by the work of the Government in limiting production of such agricultural products as cotton, grain, and others.

SCIENCE AND INVENTION—INDUSTRIAL ACTIVITY

It would appear, therefore, that if the viewpoints of industry and Government can be reconciled, science and invention are going to prove most potent factors in increasing industrial activity. To be sure, there are those who contend that science and invention are responsible in large measure for the depression which has come upon us. The engineer is blamed by many economists for replacing manpower with machinery and thus materially contributing to the unemployment of millions of people in this country. It is true that because of the machinery that has been developed a given individual can turn out much more work than was previously the case. This is amply demonstrated by our automobile factories. The foundry is equipped with continuous conveyors. Sheet metal is pressed into shape for bodies and fenders in one operation. Body finishes are now done in about one-fifth as many hours as it formerly took days. The

[1] Presented by President White at a meeting sponsored by the A.S.T.M. Chicago District Committee at the Chicago Engineers' Club, April 22.

[2] Director of Department of Engineering Research and Professor of Metallurgical Engineering, University of Michigan.

machine shops are veritable labyrinths of high-speed operation.

When one appreciates that what holds true in the automotive industry holds true, at least in part, in all other industries, it is reasonable to expect that certain groups, without a full analysis of the situation, may charge that the engineer has been a very material contributor to unemployment.

Let us, however, analyze this condition a little further. Let us assume that we have had none of the benefits of science and invention. In that case, we would not now have automobiles; we would not have our present automobile factories employing, even at the present time, a considerable number of men and in normal periods a very large number of operatives; our oil industry would not have developed to the giant which it is today; we would have but a few isolated cement plants; we would have no expenditures for highway construction of any magnitude; we would not require the vast army of workers in every village, town, and city for the maintenance of our garages; our glass factories would be relatively small and insignificant; our rubber industry would be but a puny infant; our woolen mills would need to be only half as large as at present; our requirements for cotton would be much more limited than at present, because one of the major elements in present-day automobile finishes is dissolved cotton; the leather market would feel a materially decreased demand for its products; twenty-five per cent of the requirements of our steel mills would be eliminated; the vast demands of the industry for copper and lead would not exist. We can, therefore, very properly state that, although the automobile industry is one of the industries which tries to operate on as economical a basis as possible, it is an industry which extends its roots and tendrils for raw materials to the very farmer himself, in its requirements for wool, cotton, and leather. Its start was embedded in the internal combustion engine, and its progress has been one of consistent growth as the result of scientific developments and improvements.

Thus, one can state, without any question of a doubt, that, although the automobile industry, with all of the developments that have taken place in it during the past thirty years, has been a most potent force in providing employment in this country, in spite of the fact that it has brought into being large numbers of labor-saving devices.

Let us take another case: that of plastics. A few years ago, the only plastic on the market was Bakelite. Today there are many types which furnish employment to many thousands of people. One of the most interesting of these developments is Plaskon. It was started by a far-seeing business man in Toledo, who wished to develop a suitable product for the platform of the scales made by the company with which he was connected. The problem was taken to Mellon Institute. It was investigated there for a number of years, involving thousands of dollars of expense before a suitable material was produced. The company began producing this material and within the past two or three years it has met with such success that, not only have they paid for the cost of the original research, but they have also paid for the cost of equipping a plant engaged in producing it and have returned to the stockholders worth-while dividends.

In another case, the president of one of our large corporations saw the need for an improved single-phase motor. He brought this problem to the University of Michigan. It was with considerable hesitation that the problem was accepted, due to the fact that it was in a field to which large manufacturing organizations were giving consideration. Yet, such outstanding changes were made in the single-phase motors as then produced that today practically all of the single-phase motors made in this country are manufactured on the basis of the designs and patents worked out by the man who directed this work. When one realizes that the motors in our electric refrigerators, in our fans, and in other such parts are of the single-phase type, one can appreciate the field.

VALUE OF RESEARCH

The price which many companies have paid for failing to recognize the service of research is a matter of record and history. An outstanding example is that of one of our large talking machine companies. Up to about 1920, its history had been one of almost continual growth. Beginning about that time, the radio industry interfered materially with the activity of the talking machine company. Furthermore, about that time, the American Telephone and Telegraph Co., in its work relating to the further improvement of telephone transmission, discovered how imperfect the then existing records were in the reproduction of all of the high and low tones. With this finding, steps were taken to improve the character and quality of records, with the result that there are now available, or will shortly be, records which give almost perfect reproduction.

Let us take another example. The cotton industry has been hard hit, particularly that part of it making women's stockings and lingerie. It was hard hit in the days of '28 and '29, which were years of unparalleled prosperity. Therefore, the failure of the public to buy cotton goods could not be charged against the world's economic condition. One of the major troubles was that rayon, a synthetic product, was meeting with marked favor with the buying public. These operating cotton mills had failed to be guided by certain fundamental principles. The first question they should have asked was, "What is the most popular type of fabric for these products?" The answer would undoubtedly have been "silk." They should then have asked, "Why is not silk used more extensively?", and the answer would have been, "Because of its cost." They should then have taken steps to find or develop a fabric like silk and yet considerably less expensive. Had they done so, they would have found rayon, because, in principle, it was known since 1846 and was exhibited by Count de Chardonnet at the Paris Exposition in 1889.

However, in this general connection, many of the mills have awakened to the situation that confronted them and are now engaged in the production of fabrics, many of them cotton, which have a definite appeal to the women buyers of the country. Thus, these concerns are benefiting through applications of scientific research to their industry.

The baking industry serves as another illustration. Twenty-five years ago, most of the bread in the United States was baked at home. One of the reasons for this was because the bread obtainable at bakeries was of such a varying quality. Today, as the result of the activities of the American Bakers' Association, most of the bread eaten in the United States is made in bakeries. The improvement in quality has been so great that, with all due respect to our housewives, bread of

equal or better quality can be obtained from our bakeries than can be made in most of our homes.

Our paper mills are all passing through a transition, especially those engaged in the production of book paper. This has been very largely brought about by the research work of one of our large ink-producing companies which has succeeded in bringing out a fast-drying ink so that magazines such as *Life*, and others which are filled with illustrations, can be printed at a speed unthought of but a few years ago. This has demanded a new type of book paper which has involved research on the part of the paper manufacturing concerns. Also, it has required replacement with new and rapid printing machines. Therefore, the research in the field of ink-making nas wrought a veritable revolution in the field of book papers and printing presses.

Most concerns pass through periods of prosperity and depression. All, of course, are affected by periods over which they have little control. Many of them, however, bring this condition about as the result of their own individual policies. In this present period, I venture to state that in spite of the necessary adjustment of the world's economic conditions before the depression can end, research will play its part as never before and that those industries which sponsor and support research and, in consequence, develop and produce new products for which there will be a general demand, will be the ones in the forefront in the march from depression to prosperity.

Testing of Zinc (Hot Galvanized) Coatings on Hardware

By L. W. Hopkins[1]

THE Society's Committee A-5 on the Corrosion of Iron and Steel, under its assignment to collect useful engineering information on the corrosion of iron and steel and to prepare standard specifications for metallic coated products, has given to Subcommittee VII on Methods of Testing the important job of developing adequate testing methods for use in specifications developed by the committee. Subcommittee VII, in its development of specification acceptance tests, is guided by the necessity of recommending tests which may be carried out by field inspectors with testing facilities normally available in the manufacturer's plant or which could be made available at reasonable cost.

Tentative Specifications A 153 – 33 T for Zinc Coatings (Hot Dip) on Hardware and Fastenings were published in 1933 and comments on their suitability solicited. In these specifications, stripping tests were specified for weight of coating requirements and the Preece test recommended for the determination of coating uniformity. Comments received on the tentative specifications soon indicated that the generic term "hardware and fastenings" covered a large variety of items varying in composition of base metal and in size, shape and thickness with coatings applied by many methods and having varying structural characteristics.

Early in 1935, Subcommittee VII was instructed to consider these comments and their bearing on the adequacy of the testing methods forming a part of the specifications. It was apparent that for certain types of hardware the recommended methods for determining weight of coating were satisfactory but for others entirely inadequate. One of the most troublesome classes of material were castings and particularly gray iron and malleable iron castings such as used for strain insulator fittings, etc.

Accordingly, a technical group under the chairmanship of F. L. Wolf was formed to study the problem of testing zinc coatings on irregular shaped objects. This group has been exceptionally active. Its first action was to make a thorough survey of existing and prospective methods including the following:

1. Solutions and methods for stripping—
   (a) Gas or hydrogen evolution method.
   (b) Use of Rodine.
   (c) Varying the amount of antimony chloride inhibitor.
   (d) Electrolytic methods of stripping.
   (e) Spot tests—analysis of removed solution.
2. Methods of determining area of irregular shaped articles and the use of coupons to eliminate calculations of area.
3. Microscopic and magnetic methods.
4. Limitations of Preece test for estimating weight of coating and uniformity of weights of coatings covered by discussion.
5. Mechanical tests such as scratch hardness, distortion or direct measurement before and after solution of coating.

Several of these proposed methods never got beyond the discussion stage since they were obviously research rather than inspection methods, and required such refinement of testing as would not be warranted in commercial practice. The following methods were investigated:

1. Stripping Tests:

Stripping tests involving solution of the zinc coating and determination of its weight by difference are generally satisfactory and used wherever applicable. These tests are described in the Methods of Determining Weight and Uniformity of Coating (A 90 – 33). The test involves an estimation of the area of specimen so that the unit weight of coating may be reported (usually in ounces of coating per square foot of surface). This is readily done in the case of sheet or wire or symmetrical geometric shapes.

The stripping method does not lend itself as readily to the testing of coatings on irregular shaped objects such as pole line hardware, insulator strain members, etc., in the form of iron castings, steel forgings and shapes. First, it gives an *average* figure and does not disclose the uniformity or distribution of the coating over the area of the piece.

Second, the end point of the stripping operation on heavily coated objects is not readily determined, the evolution of hydrogen continuing for an indefinite period. This is especially so in the case of gray iron or malleable cast iron, and is probably due to the relatively high solubility rate of the higher carbon material. Third, the estimation of area of irregular shaped castings is not readily done or

[1] Materials Engineer, American Chain and Cable Co., Inc., Bridgeport, Conn.; also Chairman of Committee A-5's Subcommittee VII on Methods of Testing.

reproducible unless great care is used. The variation in surface from piece to piece, especially in the form of castings, is another source of error. The probability that at least two of the above errors will be introduced in the testing of single shipments renders the stripping method, for all practical purposes, an approximate method when applied to articles of the type under discussion.

Stripping tests were conducted on several malleable castings of various shapes and on many rectangular coupons galvanized under commercially reproducible conditions. Amplified with spot tests, it was demonstrated that the thickness and the weight of coating of individual coupons varied over a wide range. For example, as to weight of coating, the weights noted varied from 3 to 6 oz. per sq. ft. with an average weight of 4½ oz. per sq. ft. It was also found that the weights of coatings varied from front to back and from top to bottom on individual specimens as much as 45 per cent. The difficulty of obtaining uniform coatings on base metal of this type handicapped the committee in applying refined methods of determining the quantity of the coating. It also brought home very forcibly the purely practical consideration as to whether refined methods involving high-cost testing could be justified on a class of material which had such inherent variations in weight of coating.

Stripping tests conducted on castings indicated close average weight of coating, but this did not take into account the distribution of the coating or the thickness of the coating on so-called "significant surfaces," which surfaces are presumed to be those which must have maximum resistance to corrosion.

2. Thickness Determinations:

Direct measurements of thickness involve sectioning and micro measurements. The specimen is destroyed in the process of test, and the high cost of procedure discourages adequate or representative sampling. For these reasons further consideration of this test, for acceptance testing of the specific class of hardware under study, was dropped.

3. Hydrogen Evolution Tests:

Hydrogen evolution tests were made on several of the cast malleable coupons. Tests were made by dissolving the zinc on a carefully measured area defined by cutting through the zinc coating with a circular cutting tool, then inserting a glass cylinder in the groove formed by the cut. This method is satisfactory for determining the weight of coating over relatively small areas of a reasonably flat section. It amounts therefore, to a uniformity test having limited application.

4. Coupon Method:

The so-called coupon method involves the use of dummy castings or parts having plane surfaces and of the same relative cross-section as the material being galvanized. These coupons are galvanized at the same time, and the resultant weight of coating is presumed to be comparative with that on the parts being finished.

Fortunately, considerable work had been done by a former committee to determine the usefulness of the coupon method. This involves the galvanizing of a coupon of similar section during the galvanizing of the parts involved. The tests conducted by this committee—which ultimately prepared the specification on galvanized structural shapes—were extensive, and conducted in several commercial galvanizing plants. The conclusions were that no correlation existed between the weights of coatings on coupons and on parts galvanized.

5. Magnetic Tests:

Consideration of the magnetic test which involves the measurement of the magnetic leakage through the coating was dropped because of the cost of developing apparatus suitable for hot galvanized coatings containing varying amounts of iron.

6. Copper Sulfate Dip Test:

Results of the tests described above lead to an inevitable conclusion—that the most desirable test to apply to the class of material described would be one that would give a qualitative picture of the weight of coating and an indication of its uniformity. Further, it must be a relatively simple test to perform in the field, since a large portion of this material is tested by field inspectors.

This conclusion leads to a critical review of the Preece test. The objections previously filed against the Preece test have been that it was not reproducible, and that it could not be used to determine the protective value of coatings applied by different methods. As we are dealing only with coatings applied by the hot dip process, the second factor does not apply. Consideration of the first factor in the light of the combined experience of committee members indicated that the low degree of reproducibility was due mostly to the following common errors:

1. The use of insufficient solution to dissolve completely all zinc from specimen.
2. A poor degree of standardization of the Preece solution, such as incomplete neutralization, the use of alkaline water, impure copper sulfate, etc.
3. Disregard of temperature of solution.
4. Disregard of temperature of test specimens.
5. Improper cleaning and rinsing of specimens between dips.
6. Application to old galvanized objects coated with zinc oxide, basic zinc carbonate, etc., without proper preparation of surface.

Many of these abuses are obvious to a trained observer or test engineer, but the very simplicity of the test has misled many users to neglect "the importance of little things."

The technical group of Subcommittee VII felt that for specification purposes, the Copper Sulfate or Preece Test, properly applied, was still the most efficient test for zinc coatings on hardware of the type under discussion. It thereupon prepared methods of applying the Copper Sulfate Dip Test incorporating therein many safeguards against false end points and explanatory notes leading toward a better understanding of the test.

This proposed standard is being submitted to the Society as a tentative method of test, subject at the present writing, to letter ballot of Committee A-5. It is entitled "Tentative Methods of Test for Uniformity of Coating by the Copper Sulfate Dip Test (Preece Test) on Zinc-Coated (Hot Galvanized) Steel Castings and Forgings, Gray Iron and Malleable Iron Castings."

Consumer Testing of Finished Textiles[1]

By Miss Nannene Gowdy[2]

THERE is no need to reiterate that there has been a tremendous increase in consumer interest in the quality and conformance to specification of the merchandise purchased over the nation's counters. This tendency received great impetus during the periods of lessened prosperity when it was necessary to make the purchasing dollar give a good account of itself. Further, a population cannot be exposed to and work with so many scientific developments without acquiring an attitude of mind which is inquiring. These two primary factors have worked to defeat the old trade euphemism "caveat emptor."

There has probably been no greater single influence in the merchandising field in the past 20 years than the agitation arising from the American woman's demand to know more about the merchandise she and her family consume and her critical approach to quality problems. It is frequently charged that we who are in the testing field over-estimate the lay person's ability to exercise a critical choice. Undoubtedly once that was so and even now it is a rare person who could make a very close approximation of the actual physical and wear qualifications of a particular item. However, the consumer is not doing it that way. In the very recent past she has been shrewdly saying to the manufacturer, the distributor, the merchandiser, "You do the testing and tell me the results." Now she is going even further when she requires not only actual test information and an actual adaptation of that test information to her particular consuming problem but also she wants reassurance concerning the item which is, in effect, a guarantee.

This natural development of buying intelligence has been fostered by a number of agencies. Primarily, the government in its various capacities of trade regulation has developed sources of information to which the consumer has access and this service is being amplified constantly. This interest is encouraged, and rightly so, by the 4 H clubs, the domestic science classes, women's clubs, cooperatives, university extension courses and various consumer organizations, all of whom support the dispersion of buying information to the consumer groups.

We are all well aware of the direction in which this is leading—more and more standardization and a definitely observable raising of quality levels. In fact, there is no question but that we are well into an age of specialization in which, eventually, everything will have to be labeled as to physical, chemical and performance characteristics. We who habitually use technical phraseology in our work, however, must not forget that specifications stated in this terminology will not mean much even to the knowing layman and that we must couch our specifications in terms of usefulness and wearability that will have significance to the buyer. Up to the present our chief quarrel with the business of labeling has been the vagueness as to what an "Approved" tag refers. It seems a little ridiculous to label merchandise "Tested and Approved" by even the most eminent of laboratories without being specific as to what definite qualities the guarantee refers. How much more precise is the label which certifies that the item was tested and approved for some specific purpose. Undoubtedly it will be but a very short time before this actually becomes a general practice.

WHY TEST?

Questions as to the necessity of all this testing frequently arise. "Why should I test?" asks the retailer. "Why should I not leave the question of how to describe the merchandise and information as to its quality to the reputable manufacturer who, after all, best knows the characteristics of the material he is selling?" A definite trend in this direction is already observable and is the only method available to the retail store owner whose volume of business does not justify the support of a testing laboratory. However, when buying is done in large quantities and particularly when it is necessary to be specific in the description of an article it is much more advantageous for the retailer to have precise and unbiased information first hand concerning the material. Add to this the desire to obtain favorable selling information which can be used for publicity and to obtain technical information as a basis for complaint adjustment and you have outlined a very wide foundation for the service which a retail testing unit can render.

Let us outline briefly what all the interests involved obtain from a testing program. What, for instance, does the manufacturer want to know that only test information can give him? He wants to know the composition of his raw materials. Are they up to specifications? Is there some other material which he can buy more cheaply that will suit his purpose just as well? Which of a variety of formulas will give him a product with the most acceptability? Is it possible by research to develop a formula quite different from but superior to those already on the market? After the processing is completed what are the special qualities which he can claim for his product when he starts to sell it? He wants to know whether the projected product is equal to or superior to other similar items on the market before he even enters the field. And if he runs into difficulties of processing he must test to learn the trouble and later test to avoid repetition of the same difficulty.

After the merchandise has reached the retailer what does he want to know about it that only laboratory tests can tell him? First, he must make a buying choice. He wants the best item that the price range of his market will allow him to stock. So many important qualities that bear on acceptance and satisfaction of consumer goods are hidden that the retailer must have some means of determining which item promises to give the most satisfaction to the largest percentage of his customers. He also needs test data as a basis for advertising claims. This is particularly true of the retailer who does an interstate business and it is rapidly becoming true of even the small local merchant because of his desire to be truthful in his advertising and because of the regulatory influence of local advertising control groups. However, the effort expended in carefully testing and evaluating a sample is wasted unless incoming shipments are checked against the

[1] Presented at a Symposium on Finishing held during the Spring Meeting of A.S.T.M. Committee D-13 on Textile Materials, March 9 to 11, Washington, D. C.

[2] Director, Bureau of Standards, Montgomery Ward, Chicago, Ill.

accepted sample. One of the most important functions of a testing laboratory in a retail organization is this checking of stock against the sample analysis.

Again it is frequently true that merchandise is built and sold for a highly specialized purpose. It is necessary for the retailer to be in a position to know which type and which manufacturer's item will fulfill this need with the greatest degree of satisfaction. And, because merchandise gives satisfaction in direct ratio to the success with which it is used it is necessary for the retailer to know the construction and qualities of merchandise so that he can properly instruct the ultimate consumer in its use. One of the factors conducive to the greatest waste in industry today is returned goods and the most satisfactory way to keep merchandise sold after it has been intelligently retailed is to teach the consumer how properly to use it. A small tag of directions for use is not sufficient. A few minutes time spent in amplifying these instructions will frequently mean the retention in the consumer's hands of an item that would otherwise have been returned. We are not a patient race at best and we have acquired a habit of mind that makes us too impatient to fuss with an article that does not perform satisfactorily when we have used, set it up or installed it to the best of our more or less ingenious ability. The ingenuity of some of us is very definitely limited and it is poor merchandising to sell us an article that will tax our patience or forbearance every time we try to use it.

There are also some articles which have an inherent quality of danger. In this case it is necessary for the retailer to test to see whether or not they measure up to what may be a rigid standard or code. This is an important consideration because, even though the article is covered by a manufacturer's guarantee and the manufacturer has to stand any loss, the retailer's loss in prestige and trust on the part of the customer is a serious matter.

CUSTOMER ACCEPTANCE; TESTING FINISHES

When the finished material is presented to the customer for acceptance she does not and cannot judge it by the standards of the testing laboratory. Hence it is not the weight per square yard (though she does exercise some judgment in this respect) or the tensile or bursting strength, etc., which influences her choice. It is the hand or the feel of the material and its color and finish which attracts. If she likes the color and the construction is the type she wants she will make a choice on the basis of general appeal, which is, of course, hand and finish. If she is a wise consumer she will inquire as to whether or not the finish is permanent to cleaning. In days gone by consumers were influenced greatly in their choice by the finish of a material but they simply did not expect it to be permanent and resignedly made allowances for this. However, today we have finishes that we claim are permanent. How permanent they are is the matter that confronts the retail testing laboratory which endeavors to judge from the consumer point of view. And by what standards is the permanency to be judged? No one type of test is sufficient because the material construction and the purpose for which it is to be used are so variable. It is here that the exercise of judgment is extremely important as to the tests which should be used. A permanent finished organdy, for instance, would necessarily have to stand up under repeated launderings. A permanent finished curtain or drapery, on the other hand, would not be cleaned or laundered nearly as frequently and the ageing quality and dirt and moisture repellency of the finish would enter in to a large extent. In this case it would be necessary to determine what effect sunlight, moisture and air impurities would have on the life of the treated fabric and the treatment. At the other extreme of surface processing we have the case of velvets and moires which are patterned in the *finish* and *not* in the weave. Here the finish becomes a matter of doubtful value. Certainly the customer is entitled to know that she can expect the material to retain its pattern only so long as it is unnecessary to clean it. Perhaps that is all she will require but she should be informed.

Before the testing is done to establish the lasting qualities of finishes, however, it becomes necessary for the retailer to devise tests which will reflect the usefulness of the characteristic. It takes a long time for laboratories to agree on standard test methods and even the need for the method does not become apparent until the new process is already fairly well established. Let us consider, for instance, the matter of water repellency. True, there are a variety of tests by which the material can be judged. There is the immersion test—by different methods—the hydrostatic pressure test, the shower test, etc., all of which essentially measure a different quality of the finish though they all bear on water repellency. The hydrostatic equipment gives a direct reading of the pressure which a closely woven, repellent treated fabric will stand. Unless you have the original, untreated material with which to compare it, however, there is always a question as to how much of the repellency is due to the treatment and how much to original fabric resistance. As a matter of fact we believe this is true, to a large extent, of any quantitative measure of repellency. The factor which must always be considered in the choice of methods for this type of test is, as we mentioned previously, the matter of weave. This test could not be used, of course, for such materials as fairly open or loose weave fabrics. In this case we would probably use the immersion test in which the quantity of water absorbed in a given time is measured. Because of the difference in fabric and weave and the necessity for using different types of test we are immediately confronted with the necessity of correlating the results so that the repellencies can be expressed in the same terms, i.e., they are or are not, water repellent. Another difficult question is the testing of crease resistant finishes. This has been dealt with at this meeting,[3] and methods will probably be forthcoming but in the meantime we are of necessity evaluating stock on our shelves for this quality. True, we have methods for testing, but we cannot correlate the crease resistance of an organdy with that of a woolen material because we do not yet know what is to be expected of each type of material in this respect. Only the accumulation of a large amount of test data and intelligent interpretation will give us this answer.

Obviously, testing from the consumer point of view has to embrace a wider number of factors than testing from the manufacturing point of view. (I am open to argument on this point.) The weaver cannot be expected to foresee all the infinite constructions to which his material will be subjected. The finisher is in a much better position to do this. He usually knows how the goods are to be used, or can easily find out. But he, too, will probably not anticipate all the uses that ultimate consumers will devise and he cannot

[3] See pages 13 and 14.

tell at the time the material is woven what claims the retailer will want to make for it. Therefore some one will, of necessity, have to test the finished product. If this devolves upon the finisher he will test it in its yard goods form. This will not show the effect of certain constructions on the material or the effect of possible trimming materials. On this point the retailer must have some method of reassurance, either a guarantee from the manufacturer or the results of his own tests.

As we have indicated, but not specifically stated, the important difference between the testing of the processor, be it the yarn manufacturer, the gray goods manufacturer, the finisher—and the retailer and consumer, whose interests are so nearly alike, is the performance of the finished material. The retail laboratory finds it very difficult in some cases to so test as to resolve the qualities of finished goods into their component parts. It is difficult and usually impossible to remove sizing and finishes particularly when they are resins or insoluble precipitates in or on the fiber. And if we are able to remove them, we cannot be sure that the basic material we get is at all like the original because of the various changes which may have occurred in finishing.

PROCESSING EFFICIENCY AND THE RETAILER

One may ask "Why is it necessary for the retailer to know the fine differences in processing efficiency?" He must know in order to choose between them.

In judging these processes, we have found it necessary to request both treated and untreated samples from the same yardage in order that we may arrive at anywhere near an intelligent comparison. This is true of such things as the waterproof and water repellent materials mentioned previously.

It may seem a little unnecessary for the retailer to test the untreated materials as well as the treated until you consider the trend of advertising today, which is to become more and more factual. In describing a crease resistant treatment, for instance, some basis for comparison must exist if one is to say—as copy writers insist upon doing—this fabric is 50 per cent or 125 per cent—more resistant to creasing than it was in its unprocessed state. Or—a mattress of this construction has 50 per cent more resiliency than previous constructions—or, to stay in the textile field—take the matter of porosity. A manufacturer approaches the retail store buyer with a fabric which he claims has much increased porosity from a special treatment. To check the statement it is necessary to test both the treated and untreated fabric. And to be scientifically precise, the treated and untreated samples should be from the same piece. This is difficult for the retailer. For one thing, these new developments appear for exploitation long before test methods have been developed to cover them. And certainly long before any test method has been standardized and generally accepted. There are usually methods in existence which can be used—but they have to be adapted to a degree, and usually no two laboratories will be using precisely the same method.

The matter of light fastness and the judgment as to whether or not a certain fabric is satisfactorily fast is always a moot point. Perhaps in a patterned material only one color will fade—and not change the character of the pattern to a great degree. Or perhaps perfectly fast dyes were used but the finish which was applied has bleached to a point where there is a noticeable difference in the fabric appearance. Is this change—which is not a dye failure—to be considered a fade? It certainly must be from the retailer's point of view—because the material may look streaked and be returned as unsatisfactory.

CONSUMER WANTS BUYING FACTS

And now some one of our articles has reached the consumer for a choice. What does he want to know about the merchandise? He wants definite buying facts; he wants to be able to check this article against another one he has seen down the street, in the city or in a catalog. He wants to be assured that the item will fulfill his needs. He wants to be sold something that will be entirely satisfactory for the purpose *for which he intends to use it* and he does *not* want to be sold the most expensive merchandise obtainable for his specific purpose. If he does invest in the highest priced unit he wants hard and fast reasons why the additional investment will be an advantage, all things considered. If he is buying percale sheets and one is priced 29 cents more than the other he wants a better reason for buying the higher priced item than the fact that it is more attractively packaged. He is entitled to be told that the price difference will assure him a longer wearing article that will be more satisfactory during its entire life than the more inexpensive sheet. And he wants this information as factually as possible in terms of strength, launderability, etc.

Who is going to give this information to him unless someone in the manufacturing or retailing of the item has tested it to find out exactly what its performance will be? We must emphasize that an intelligent merchandiser should be sufficiently armed with facts about his merchandise so that the bewildered consumer can come to him with details of the conditions under which the goods will be used and will be able to depend on the advice of that retailer as to what would be the best item to suit that purpose. Frequently a choice in the consumer's mind lies between an inexpensive item which will have to be frequently renewed and a more expensive one with a much longer life. But perhaps the consumer is not entirely clear in his mind as to just what are the advantages and disadvantages of each possible choice. This is where the retailer should have test information which will allow the consumer intelligently to weigh the matter.

The consumer also wants to know how to care for the merchandise. We, of course, know that the Utopia has not arrived wherein each consumer will exercise intelligence in handling an item he has purchased. However, if he is convinced that its qualities are such that he was well justified in buying it he will be inclined to care for it with considerably more precision than if he feels that it was an unwise purchase. Does it measure up in utilitarian qualities with others he has seen on the market so that he has a pleasant feeling that he made a wise, and, perhaps, a shrewd choice?

FURNISHING THE FACTS

Now that we have covered the need for specific information let us inquire how we shall obtain precise facts and whose shall be the responsibility of providing these facts. As stated before, the facts used should be detailed and pertinent to the merchandise. No one is in a better position to provide pertinent information than the manufacturer. However, it is not infrequently the case that the manufacturer does not *know* the performance of his finished article. Even though he has exercised care in the selection of raw materials

and processing he should test the manufactured item after its completion. We know, of course, that building to a specification or testing the completed product is expensive and very many manufacturers are of the opinion that some articles have too low a sales price and a markup much too narrow to justify the cost of testing. This is particularly true in highly competitive lines. But where would testing be of more value than in a large volume or high competitive line? The possibility of improvement in any volume item is worth an expenditure to obtain test information regardless of the profit spread. The manufacturer who is producing a large quantity of inexpensive merchandise can ill afford *not* to test its inherent qualities or not to be prepared to give specifications or, at least, performance data that may be passed on to the consumer.

Have you ever stopped to realize just how patient these consumers really are? We all have had experience with the chronic complainer but in the main the consumer has to have pretty strong provocation before he takes the trouble to return goods or register a complaint against them. He is not readily articulate and we have no way of gaging how many things that give him dissatisfaction are not returned because he does not feel like making an issue of the matter or because he does not know exactly what is the trouble. He simply decides to do his buying elsewhere in the future. The consumer does not know terminologies, usually, and those he does know are not standardized so that complaints from a large group can be easily translated into recognizable factors of definite weakness. We have listed articles that do not measure up well at all when tested but the return figures have been exceptionally low even after the merchandise has been in the customer's hands for what we thought was its expected life. In some cases the low percentage of returns on items that have been in the customer's hands for months refutes a strong stand the testing laboratory may have taken on the undesirability of the product.

Another function of the laboratory—*some* laboratory, either the manufacturer's or the retailer's—is to provide information on the use and care of merchandise. In the case of a textile product, if it can be laundered, under what conditions should it be laundered? If it should not be laundered, can it be successfully dry-cleaned? In either of these processes what are the expectancies as to the amount of shrinkage? Is there a chance of the goods being tendered in either cleaning process and, *very important,* what color change will take place? Will the fade be so hopeless that the article cannot be used with any satisfaction after it is washed the first time? Is there present so much excess dye that it is not safe to wash the article together with anything else? Will the material lose what may be a very attractive surface finish? And finally, how should the material be pressed if it is a delicate fabric or one that needs to be stretched back into shape in the pressing? It is not necessary to keep a large number of different types of labels to cover all these exigencies. It is surprising how pertinent information can be condensed and still be sufficiently general to apply to a number of different types of articles.

Another extremely important quality on which the experienced testing laboratory can report to advantage is the probable life of the merchandise. Obviously judgment as to the probable satisfactory length of life for an item must be based on the type of merchandise it is. If it is highly seasonal, highly styled and a strictly fashion item it is necessary to judge it by other standards than are used for instance in evaluating towels or floor coverings. However, even in a short-lived item it is a mistake to allow quality standards to fall too low, even for a price. If a dress slips at the seams the first time it is worn or if annoying raveling takes place around the edge of the hem the customer has not bought enough satisfaction to justify even a minimum purchase price.

The most important field for buying to a specification from the point of view of the consumer, however, is acquisition of utilitarian and long-lived items. In this classification we find sheets, toweling, rugs, draperies, electrical equipment, etc. *From* this classification we do not wish to exempt even the lowest priced drapery yard goods because of the time and effort the consumer spends in fabricating the drapes or slipcovers or bedspreads. Many times there arises a fine point of distinction whether the item is strictly utilitarian or whether it has some added quality of hand, luster, color or adaptability that takes it out of the strictly utilitarian and into the field of luxury merchandise. Even when the shortcomings are made very clear there are certain groups of consumers who can and are willing to pay for luxury qualities even though they are quite aware that the item does not have the durability of the more substantial and less attractive goods. As a matter of fact, there are some customers to whom the idea of fragility is appealing. They like to feel that they are paying extra for an aesthetic appeal at the expense of practical considerations. This is demonstrable in percale sheets, for example, which have a definite luxury appeal in their hand but may not be expected to give the same length of service as the heavier sheeting materials. If the customer is informed as to the respective qualifications of merchandise in different price ranges and she chooses the more fragile and also more expensive item because of its luxury appeal she is very unlikely to return with complaints as to its wearing qualities. But she is entitled to have these advantages and disadvantages clearly outlined. She is also entitled to be told that good care and intelligent handling will pay for itself many times over in the preservation of not only the utilitarian qualities for which she has paid a standard price but also the luxury qualities for which she has paid a premium.

This, then, is what we have come to believe is the proper placing of responsibility in the business of consumer testing of finished materials. We believe the manufacturer of the raw materials should specify the exact amounts of the different ingredients present *including* the amounts of filler or adulterants. If there are specifications obtainable for the merchandise the manufacturer should label it *if* it complies. If the manufacturer has used dyes which are of the type which should yield a fast color he should test the finished product and be willing to certify to this fact on his bill of sale. The retailer should test not only to exercise a check of the reliability of his sources but also to develop sales points and to ascertain his competitive position. The consumer representative, whoever it may be, should test to determine the applicability of products to the use for which they are intended, what instructions should be provided for their handling, to develop possible new uses and applications and for their conformance to the claims which are made in advertising.

ULTIMATE CONSUMER EDUCATION

Until all this has come to pass, however, the education of the ultimate consumer should be furthered as rapidly as possible. She should be taught what are the important qualities that are pertinent to the particular item she is purchasing. Criticism on the part of the consumer organizations should be constructive as well as destructive in that it should take into consideration the price range of the article and not demand the same specification conformance and merchandise performance in the inexpensive article as is demanded of the higher priced item.

Let us not forget, however, that all talk of consumer education is hopeless until all the manufacturers, merchandisers and test units come to an agreement on terminologies they will use. How can we hope to educate the consumer to fine or even coarse differentiations until we ourselves decide what our standards are going to be? While there is still a vast amount to be done in this direction, real progress is being made, though the surface has as yet been barely scratched. As a closing thought may we all be watchful that this labeling program which will further the consumer's interest in and intelligent acceptance of good quality merchandise sold to fill a specific want be not abused and discredited. None of us are perfect and some of us will give lip service to this program but will try in every way to avoid conformance through the desire for profit. Frankly, we do not see how this type of manufacturer or retailer can endure under the new order. As soon as anything is reduced to a formula or a specification it becomes very easy to check on merchandise quality. If and when the ultimate consumer begins to ask for pertinent factual data and really understands the importance of each characteristic in the light of its usefulness and probable life, then will the testing program not only take its proper place in both selling and buying but it will also inevitably expose the manufacturer or entrepreneur who is being consciously untruthful or evasive.

It is our hope that methodologies and definitions may be rapidly developed and disseminated so that we may all mean the same thing by the same words and phrases and that we may agree as to a concise and intelligible way of presenting the pertinent information to the ultimate consumer.

Crease Resistant Textile Finishes as Consumers View Them[1]

By Ephraim Freedman[2]

APPROACHING the subject of permanent textile finishes from the manufacturer's point of view, one is impressed with the amount of literature that has appeared in a relatively short time. This literature (a partial bibliography is appended) includes references to the term "permanent," descriptions of various processes for producing such a finish, methods for evaluating crease-resistant materials and other valuable data.

The approach from the consumer's viewpoint is quite another matter. Most consumers have not yet become crease-resistant conscious. And perhaps it is just as well.

The term "permanent finish" is ill-advised because it is ambiguous, too embracing, and not too truthful. It embraces many properties when only a few interrelated and allied ones are involved.

There are many other finishes and while not all of these have been called "permanent," the terminology has, in a number of instances, indicated either permanency or absolute conditions of performance. I refer to terms like "fireproof," "stainproof," "shrinkproof," "mothproof" and the like.

Many of us will agree that these "absolute" terms, exaggerating the performance or durability characteristics of the finish, build consumer skepticism.

If what we have in mind at present is "crease-resistant" finishes, why not let us call them just that?

Probably no one manufacturer, retailer, consumer, or technician realizes all of the problems involved in this subject. However, in so far as consumers are concerned, a few are aware of this new type of finish and have a somewhat hazy idea of some of its properties.

Since it is logical to suppose that consumers are and will be groping for information to establish a viewpoint with relation to this interesting and worthwhile development, I am giving below a list of questions which consumers may ask.

If manufacturers will view their crease-resistant finishes from the consumer angle, they will seek the answers to these questions: What is meant by a crease-resistant finish? Will it give consumers better or more attractive textiles? Will it be within the reach of their pocketbooks? Will it keep curtains crisper, furniture covers from creasing, dresses from wrinkling, collars and cuffs from wilting, ties from rumpling, velvets and other pile fabrics from crushing? Will it do these things absolutely or just to a degree? Will it help to keep clothes and drapes from soiling?

Will it remain resistant under conditions incidental to its use or will the finish have to be renewed? Can it be renovated without loss of effectiveness? How many renovating treatments can it take? Will it have obnoxious odors? How long?

Will it cause the fabric to fall into holes? Will the fabric tear more readily or wear out faster? Will the material fade or discolor sooner? What effect will atmospheric conditions have? Will the material tend to curl when it is supposed to be straight, or straighten when it is supposed to be curled or become limp in the presence of moisture?

Does it contain any substances that may irritate the skin? What should be known about the care of crease-resistant materials? How can one judge between the different grades? Can stains or spots be removed without impairing the finish? If different types of crease-resistant finishes are in circulation and some are affected by washing, others by dry-cleaning, etc., how are consumers, commercial laundries, or dry-cleaners to know?

[1] Presented at a Symposium on Finishing held during the Spring Meeting of A.S.T.M. Committee D-13 on Textile Materials, March 9 to 11, Washington, D. C.

[2] Director, Macy's Bureau of Standards, R. H. Macy and Co., Inc., New York City.

TABLE I—EFFECT OF CREASE-RESISTANT FINISH ON COTTON DOTTED FABRIC

	Original Fabric	Treated-Fabric Increase Over Original, per cent	Treated—Decrease from Treated Specimens after 10 Washings, per cent			Observed Differences of Treated Fabric Compared with Untreated Fabric after Subjecting Each to 10 Washings, per cent		
			Method "C"	Method "O"	Method "B"	Method "C"	Method "O"	Method "B"
Tensile Strength—65 per cent Relative Humidity, 72F.								
Warp	48 lb.	6	29	26	33	0	+6	+3
Filling	25 lb.	16	17	21	28	+4	0	0
Wear Resistance at 65 per cent Relative Humidity, using 320 Metallite Cloth and Anchoring Specimen Under Load of 200 Grams								
Warp	40 rubs	130	24	45	64	+112	+9	0
Filling	67 rubs	18	15	19	52	+97	+12	−13
Resistance to Creasing as Noted on Recoverometer. (The Figures Represent the Magnitude of the Angle of Recovery in Degrees After Creasing with a 500-g. weight for 16 min.)								
Warp	32.5	38	33	17	22	−17	+6	−7
Filling	27.5	45	25	37	32	+18	−13	0

We have not examined all of the different crease-resistant finishes on the market, nor have we made any attempt to identify the different types of finishes. But we have subjected some of these products to test with interesting results. Table I sets forth the differences noted on some characteristics of cotton dotted fabric before and after being treated with a so-called permanent crease-resistant finish:

From Table I we may observe that:

1. While the finish appears to strengthen the fabric, no significant effect on the finish is noted after ten standard Method "C," "O," or "B" washings.
2. The finish has a marked influence on the wearability of the fabric. It is but slightly affected by ten "C" washings, is increasingly affected by ten "O" washings, and its influence is evidently removed by ten "B" washings.
3. The finish has a marked influence on the resistance to creasing, but this influence is materially reduced if not entirely destroyed by ten "C," "O," or "B" washings.

Tests on some washable glazed chintzes disclosed removal of all of the glaze after three Method "C" or one Method "O" washing. A dry-cleaning test on another specimen of glazed fabric chalked the glaze. Still another glazed chintz was not affected by one Method "C" washing but was slightly affected by one Method "O" washing.

A lot of thirty-eight glazed chintzes was slightly affected by one Method "C" washing.

Fading tests on seventy-two specimens of guaranteed "sunfast" chintzes resulted in the excessive fading of seven, appreciable fading of eighteen, and the noticeable fading of sixteen specimens. Only thirty-one of the seventy-two specimens withstood forty Fade-o-Meter hours without fading.

Incidentally, these glazed chintzes developed crease marks after one thousand folding actions.

Tests on another thirteen specimens of "practically creaseless" cottons disclosed them to crease readily.

Obviously many of the fabrics now described as being treated with "permanent" textile finishes are incapable of withstanding many of the conditions to which they are likely to be subjected in normal use.

There is great need, therefore, for a closer study of the properties of each of these textile finishes, and for a closer adherence to factual terminology in the description of special finishes as applied to textiles.

The answers to many of the questions previously enumerated must be forthcoming if the materials are to be put to widespread use.

Let us resolve to develop this information at the source of manufacture and make it available to retailers, consumers, laundryowners and dry-cleaners by means of labels affixed to the merchandise and by clear and factual descriptions in all of our literature. Such a resolution, faithfully carried out by the manufacturers, must result in a widespread consumer acceptance of worthwhile crease-resistant finishes.

BIBLIOGRAPHY

Philip Le Brun, "Anti-Crease Finish on Necktie Fabrics, Rayon and Cotton," *Textile World*, Vol. 86, January, 1936, p. 9.

"Creaseproof Fabrics," *Textile World* (Processing Digest), Vol. 82, p. 128.

"Anti-Crease Linen in Experimental Stage," *Textile World* (Processing Digest), Vol. 84, January, 1934, p. 121.

"Proletarian Velvets," *Textile World*, Vol. 85, October, 1935, p. 72.

Herbert F. Schiefer, "Evaluation of Crush Resistant Finishes—Treatments for Fabrics," *Journal of Research*, Nat. Bureau Standards, Vol. 19, July-December, 1937, p. 571.

Philip Le Brun, "Use of Synthetic Resins to Produce Wool-Like Finishes on Spun Rayon," *Textile World*, April, 1937, p. 120.

Edwin J. Saxl, "Crushproofing Tests," *American Dyestuff Reporter*, February 7, 1938, p. 68.

"Process Development," *Textile World Annual*, Vol. 88, p. 72 (1938).

Permanent Textile Finishes — The Manufacturer's Standpoint[1]

By K. H. Barnard[2]

AT the outset, it should be indicated that there is no such thing as a strictly permanent finish. Of course, the entire question hinges on the word "permanent." Webster defines it as "continuing in the same state without any change that destroys form or character." Even cloth made of glass will wear out in time and yet it is about as permanent a fabric as one can imagine. Neither are there any dyestuffs which will not fade if exposed long enough to sun and washing. We live in a changing world—therefore,

[1] Presented at a Symposium on Finishing held during the Spring meeting of A.S.T.M. Committee D-13 on Textile Materials, March 9 to 11, Washington, D. C.

[2] Chief Chemist, Pacific Mills, Lawrence, Mass.

let us first set up standards for permanency as applied to a fabric finish.

A committee of the American Association of Textile Chemists and Colorists has already attempted to do this. This group defines a permanent finish as one that shows "no appreciable change in hand or visual appearance after repeated laundering if cotton, or repeated dry cleaning, if rayon." As you know from sad experience, the ordinary starch or gum finish on cottons and rayons, often softened with a sulfonated oil or fat and perhaps fortified with talc or clay, parts company with the fabric at the first wash tub and a smooth, silky shirting comes out a sleazy cheesecloth and a soft, downy flannel returns with a harsh, roughed-up appearance. We have no apologies to offer for this present state of affairs. Cloths have been finished this way for years and must represent a consumer demand since they continue to be purchased, while similar fabrics without these regular finishes could not be sold. There is a better finish available now, however.

In the above definition, there is no reference to strength, stretch, shrinkage or color fastness. These other items are of vital interest of course. Permanency of color, serviceability, etc., are essential, but these items are entirely separate from the finish which concerns merely the character, hand or feel of the goods and their appearance. Often good permanent finishes will improve these very factors. They add strength, they make fugitive colors faster, they tend to reduce shrinkage, but if a cloth with a permanent finish must be rejected because it shrinks 5 per cent in washing, the report should be labeled "poor shrinkage" and not "lack of permanency."

METHODS OF TESTING

How shall we test a finish for permanency? Here again the A.A.T.C.C. committee is working on an answer. On cottons, make the usual washing test at 160 F. with soap and soda using a rotary washing machine and, if possible, a square yard of fabric. If the original finish is a smooth, calendered one, as is usually the case, the sample should be ironed with a hot iron in order to work back toward this original finish. It is doubtful whether any permanent finishing material will ever be available that will give the effect of the calendered finish without ironing. The washing tests should be repeated five times and the final washed and ironed sample compared with the original finish. If the fabric is rayon, which would normally be dry-cleaned, the sample should be dry-cleaned instead of washed, in accordance with the Recommended Commercial Standard for Woven Dress Fabrics, TS 2171, page 13. The dry-cleaning test should be repeated five times and the final sample compared with the original finish. If the tested sample is no different in appearance from the original sample, the finish is considered permanent.

If we want to measure the crease resistant properties of the fabric, two excellent articles by Dr. H. F. Schiefer, of the National Bureau of Standards, have been published in the *American Dyestuff Reporter*.[3] The first describes his work on velvets and pile fabrics, while the second covers plain fabrics. He gives three different methods, all showing fair agreement, on the effect of the resin on the original finish. Of course, the ultimate consumer rarely has the original fabric for comparison and Doctor Schiefer's work depends on the comparison of the treated sample with the untreated. This difficulty can be surmounted by treating the finished cloth with $\frac{1}{2}$ per cent hydrochloric acid at 140 F. for $\frac{1}{2}$ hour, thus removing the resin and bringing the fabric back to approximately the original condition, before the anti-crease treatment.

[3] H. F. Schiefer, *American Dyestuff Reporter*, November 1, 1937; January 10, 1938.

MATERIALS USED

Another topic of interest concerns materials used to obtain these permanent finishes. In the case of the Tootal anti-crease process, there is an outline of the method in U. S. Patent 1734516, dated November 5, 1929. We make our own urea-formaldehyde resin as a clear, water white solution which, when padded on the cloth and baked, sets up to an insoluble, polymerized resin. This finish has been on the market in this country for about six years and is licensed to a dozen other companies besides Pacific Mills. We alone buy urea by the carload for the sole purpose of making this resin. The art in anti-creasing comes in the skill used in manufacturing the resin, the choice of the proper catalyst, and the ability to get the resin inside the fiber and prevent a mere surface coating. Back of the finishing plant's work on these problems lies several years work in designing a gray fabric for the use intended, especially in the production of the proper yarns which are quite complex in themselves.

Closely related to the anti-crease resins are the group of more viscous urea-formaldehyde resins, more highly polymerized than the simple penetrative type used in that work. These are used more in surface coating where a permanent hand, or where such special properties as an anti-slip finish for rayon, is desired. A whole family tree of these is available. Next are those resins of the acryloid type which are somewhat thermoplastic and may be sold as clear solutions in solvents such as ethyl acetate or as water emulsions. These, even in small amounts, give body and fullness to the goods and possess excellent permanency to the action of soap and water.

Another type of resins are the glyptals made from phthalic anhydride combined with drying oils. These are very tough and durable and are able to retain or hold a large percentage of inert pigments such as talc or clay where such materials are needed to add weight to the cloth. This type of resin is not quite as white as some previously mentioned, but they are valuable on industrial fabrics where wear resistance, and not color, is a great factor. They are soluble in hydrocarbons.

Quite a different approach to the problem of permanent finishes is the use of a solvent for cellulose. Probably the cheapest and oldest is cuprammonium. The solvent action tends to fuse the yarns together giving a certain resiliency or stiffness as in permanently finished voiles. The action is much the same as if the wires in a wire screen were fused or welded together where they cross, thus preventing them from slipping over each other and stiffening the whole structure.

By dissolving cellulose in the solvent and later padding it on a cloth, weight and softness are obtained without stiffness, or by varying the amount of free solvent, a combination of the two may be obtained. Instead of cuprammonium, one can use "Triton B" or, chemically, trimethyl benzyl ammonium hydroxide. This is a powerful solvent for cellu-

lose and as such can be used for permanent voiles or again by predissolving cellulose in this solvent, the latter can be precipitated with acid on the cloth as a pure cellulose film. One might even consider the Haberlein process using sulfuric acid at a low temperature as a similar type of permanent finish, although its action is more a swelling or parchmentizing process rather than a true solution of the cotton.

Still a different type are the cellulose ethers. Here again the variety is infinite, but for simplicity we will consider only those which are soluble in alkalies or those soluble in organic solvents. The alkali-soluble type have numerous advantages—they are readily applied, do not require baking, and are relatively low in cost. They come in a wide range of viscosities so that soft, full finishes, or hard, stiff ones can be obtained. The cellulose is precipitated either by heating or by acid, and even by strong alkali, and is so permanently attached to the goods that they can be kier boiled. This permits application of the permanent finish to the gray goods which has certain advantages from a manufacturing viewpoint.

One of the solvent types of cellulose ethers is ethyl cellulose, better known in the lacquer business than textiles, but possessing certain unique advantages such as being thermoplastic. This permits regenerating lustre after washing, by ironing to a relatively smooth, stiff finish.

GENERAL CONCLUSIONS

This outline should suggest the complexity of the problems facing a mill chemist who must select intelligently the proper resin or finish for specified goods. On the other hand, this great variety of new products suggests that almost any special property which a customer demands can be met by at least one of these products. One thing to be kept in mind from the mill standpoint is that special equipment is generally required to run these finishes. It is quite obvious that the ordinary wooden tanks, wooden rolls and mangles cannot be used where finishes are used which dissolve cellulose because the wood itself would soon be worn away. Mills which run permanent finishes are forced to build special machines, sometimes special baking equipment—often of stainless steel. In addition to these capital charges, labor and material charges are also higher for the permanent finishes than for the regular ones. The new finishes require more exact chemical control and the materials used cost from two to ten times as much as the usual starches and dextrines, etc.

All good things in this world have a price and with respect to permanent finishes, one of our greatest difficulties from the mill standpoint is convincing the consumer that a superior and permanent finish is worth its higher cost. You can get permanent finishes—a great variety of them—if you are willing to pay for them.

Committee on Textile Materials Advances Work

A VERY active series of meetings of numerous subcommittees and general sessions of the main committee were held by Committee D-13 on Textile Materials in Washington, March 9 to 11, at the Hotel Raleigh. The meetings were featured by several interesting papers and included a Symposium on Finishing. The three papers included in this symposium involving discussion of permanent finishes from the viewpoint of the consumer and producer and on consumer testing of finished textiles appear elsewhere in this BULLETIN.

Other papers covered "Specification of Uniform Color Tolerances for Textiles" by Deane B. Judd, National Bureau of Standards, and "Standardization of a Method for Measuring the Fluidity of Dispersions of Cellulose in Cuprammonium Solutions" by R. T. Mease, National Bureau of Standards. At several of the subcommittee meetings there were technical papers including one on "The Measurement of Luster as Applied to Textile Fabrics" by R. S. Hunter, National Bureau of Standards, and in the Section on Cotton of Subcommittee A-1 there were three papers covering "Some Breeding and Production Aspects of Cotton Quality" by H. W. Barre, Bureau of Plant Industry; "Cross-Sectional and Related Structural Features of Cotton Fibers Influencing Quality" by Enoch Karrer, Bureau of Agricultural Economics; and "Some Possibilities and Limitations of X-ray Methods for Measuring the Strength of Raw Cotton" by C. M. Conrad, Bureau of Agricultural Economics.

ACTIONS ON STANDARDS

The committee took a number of important actions in connection with its standardization work. Possibly of predominant interest was the recommendation of the subcommittee on household and garment fabrics, organized last year, to publish tentative specifications and tests covering bleached wide cotton sheeting, turkish toweling and single-ply bleached cotton broadcloth. There has been a very definite demand from many interests for standards for these materials.

Tentative "appearance" standards for cotton yarns ranging from 3's to 125's were recommended and the issuance as tentative of a standard regain of 7½ per cent for cotton yarns and threads. Based on a large number of tests, revisions are being recommended in the Standard Specifications and Methods of Test for Cotton Goods for Rubber and Pyroxylin Coating (D 334 – 34) providing a standard and alternate method for determination of amount of warp sizing present in cotton gray goods and also a change raising the allowable percentage of sizing and natural oil and waxes to 11 per cent for sateens and broken twills.

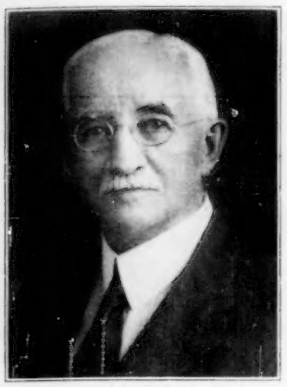
The new section on rayon staple and spun rayon yarns, headed by K. B. Cook, held its first meeting and recommended that proposed methods of testing and tolerances for spun rayon yarns be submitted to letter ballot. Standards for rayon staple are being developed.

The subcommittee on wool submitted a number of proposals including proposed methods of testing yarns spun from wool mixed with fibers other than wool, and a change in the Tentative Methods of Testing Pile Floor Covering (D 418 – 37 T) by the addition of a method for determining "back thickness." Drafts of a proposed laboratory method for determining the shrinkage of grease wool and test for fiber length of wool were reviewed and approved for submission to ballot of the subcommittee.

A method for the quantitative determination of Tussah silk in mixtures is to be presented and published for information. A new tentative procedure for determining fastness of colored textile fabrics to light is to be balloted upon.

A. N. Talbot Honored by Illinois

DR. ARTHUR NEWELL TALBOT, Professor of Municipal and Sanitary Engineering, *Emeritus,* at the University of Illinois, was honored by his Alma Mater on April 21 in the renaming of the materials testing laboratory as the Arthur Newell Talbot Laboratory. Already the recipient of the highest honors conferred by his fellow engineers and associates, this unique honor was given to Doctor Talbot in recognition of his services as teacher and investigator, extending over a period of nearly sixty years, which have contributed so much to the University of Illinois and to the engineering profession.



A. N. Talbot

Robert E. Doherty, Illinois '09, President of the Carnegie Institute of Technology, Pittsburgh, Pa., made the principal address at the Convocation in the University Auditorium, at which M. L. Enger, Dean of the College of Engineering, presided. A Reception and Dinner were held in the evening, bringing the celebration to a close. The Society was officially represented at the Convocation and Dinner by C. L. Warwick, Secretary-Treasurer. President A. E. White was unfortunately prevented by illness from attending.

The Dinner, at which upward of 400 friends and associates of Doctor Talbot from all over the country were gathered, was presided over by H. F. Moore, Professor of Engineering Materials at the University, and Past-President of A.S.T.M. Speakers at the Dinner were Dr. Arthur C. Willard, President of the University, who welcomed the guests; Dr. David Kinley, former President of the University, and Dr. A. H. Daniels, Dean of the Graduate School, who spoke on behalf of the University and Doctor Talbot's many friends; F. E. Richart, Research Professor of Engineering Materials, who spoke on behalf of the University faculty and alumni; Mr. Warwick, who spoke on behalf of the technical societies, and F. E. Schmitt, Editor, *Engineering News-Record,* who spoke on behalf of the engineering fraternity. Doctor Talbot brought the meeting to a close with a brief but appropriate response.

The University of Illinois has published a booklet entitled "A Tribute to Arthur Newell Talbot," commemorating the renaming of the Laboratory. A limited number is available upon application to Professor F. E. Richart, College of Engineering, Urbana, Ill.

Doctor Talbot, A.S.T.M. Past-President and Honorary Member, has received numerous awards including the Washington Award of the Western Society of Engineers, and in 1937, the John Fritz Medal of the United Engineering Societies. The citation in connection with the award of this medal is very fitting as a summary of Doctor Talbot's broad achievements: "Molder of men, eminent consultant on engineering projects, leader of research and outstanding educator in civil engineering."

Manufactured Masonry Units

AT its meeting in Pittsburgh on March 17, Committee C-15 on Manufactured Masonry Units voted to recommend important actions pertaining to the standards on clay building brick, concrete masonry units, and structural clay tile.

For several years the standards of the Society classified building brick in accordance with strength properties, without reference to durability. The present standard for clay building brick (C 62 – 30) is such a specification. The Committee has now voted to recommend the withdrawal of this standard which will leave the present tentative standard for clay building brick (C 62 – 37 T) as the sole specification of the Society relating to this product. In the tentative standard the classification is based upon properties which are intended to classify bricks in accordance with their resistance to frost action. A note in the specification calls attention to the fact that bricks of several strengths may be obtained and quotes a strength classification from another authority.

Thorough editorial revisions of the standards relating to concrete masonry units have been made. These include the separation of the specification requirements from the methods of testing and will result in a single standard method of testing which applies to all concrete units except brick. New proposed tentative specifications for catch basin and manhole blocks had already been approved during the year.

Extensive discussions of the merits of requirements for weights of structural clay tile have taken place at numerous committee meetings and the committee is now proposing the publication of a new tentative specification for load-bearing tile in which detailed requirements for shell and web thickness and for shape factors have been substituted for the requirements on weight. A proposed tentative amendment of the standards for non-load-bearing and for floor tile permitting the waiving of the weight requirements for tiles complying with certain dimensional standards also is being recommended.

The recently formed Working Committee on Sizes of Masonry Units was instructed to prepare a list of dimensions for masonry units which conform to a size module. While similar efforts to coordinate the dimensions of building materials in the past have failed, the merger of Committees C-3 and C-10 to form Committee C-15 has resulted in the formation of a single committee dealing with masonry units, and consequently the problem of obtaining cooperation between the various interests concerned may be simplified.

The results of cooperative research on the application of the methods of testing (C 67 – 37) to the testing of a series of clay bricks carried out by Columbia University and the National Bureau of Standards were reported. Water absorptions were determined by both laboratories on the same half bricks. Compressive strength were determined on both halves of the same bricks. Following the methods specified, the agreement between the values for water absorption was excellent, indicating that reproducible values may be obtained when the methods are followed carefully.

J. W. McBurney briefly summarized the results of an investigation of the effect of certain variations in the technique of making freezing-and-thawing tests on comparable samples of brick. A paper describing the investigation is being prepared for presentation to the Society.

ASTM BULLETIN

Published by
AMERICAN SOCIETY FOR TESTING MATERIALS

•

President
A. E. WHITE

Vice-Presidents
T. G. DELBRIDGE H. H. MORGAN

Secretary-Treasurer
C. L. WARWICK

Members of Executive Committee
P. H. BATES H. F. GONNERMAN F. E. RICHART
H. F. CLEMMER G. E. F. LUNDELL R. L. TEMPLIN
O. U. COOK H. C. MOUGEY J. B. YOUNG
C. S. REEVE

Past-Presidents
HERMANN VON SCHRENK H. S. VASSAR A. C. FIELDNER

Assistant Treasurer J. K. RITTENHOUSE
Assistant Secretary R. E. HESS

No. 92 **May, 1938**

Testing Instruments

IN the very early days of the Society, back in the period from 1898 to 1910 or so, when the standardization work covered a less extensive list of materials than it does today, but was largely limited to the fields of metals, cement, paints, etc., the question of different types of testing apparatus did not assume nearly so important a place as it does today. This is not intended to imply that those developing standards were not keenly alive to the many factors of importance in connection with testing. As a matter of fact, as early as 1899 there appeared in the *Proceedings* of the Second Annual Meeting discussion of the discrepancies in testing, pointing out the importance of the American Section of the I.A.T.M. studying uniformity of test pieces, speed of testing and means of measuring values desired. This was only one of numerous discussions involving control of machines and the like.

As the work expanded, it was essential in many fields that special types of machines be developed and special apparatus, and today anyone who studies a representative cross-section of the A.S.T.M. specifications and test methods is amazed at the wide range of instruments required. Incidentally, a brief trip through one of the A.S.T.M. exhibits held in connection with some of the annual meetings or a review of some of the large laboratory supply house catalogs gives a good conception of the wide range of so-called A.S.T.M. apparatus. For certain materials it has been satisfactory to adapt instruments originally designed for the testing of an entirely different type of material, but by and large standardization involving a new materials field brings its own instrument problems. In a number of fields there has been much activity in recent years concerning the types of testing instruments to be used—to name just two—the fields of cement and petroleum products. It is natural to expect that for some materials types of instruments used in the early days would with refinements and improvements still measure adequately the properties required to be evaluated, but in other fields instruments and equipment used in the beginning may need to be superseded by equipment of entirely different design or principle to provide a better measure of a given property.

Committees of the Society are constantly considering the adaptability of new instruments, incorporating more rigid requirements, and making a very earnest attempt to keep the specifications covering instruments in line with improvements in materials manufacturing processes. There has been very evident a spirit of cooperation on the part of instrument companies who are so vitally concerned with many of the A.S.T.M. standardization procedures.

Here Again

WHILE annual meetings recur with a steady regularity, this regularity is far from the monotonous variety, because each meeting differs from preceding ones in a wide number of respects—technical program, new activities which come to fruition, initiation of new work and the like.

Too, there are always many new faces—men who have recently joined in the Society's activities, or older members who for various reasons have not been able to attend previous meetings. These new faces with the attendant enlarging number of contacts which the members make are significant. More than one member has made the statement that the contacts he has made in various ways at the annual meetings of the Society have repaid many times over not only the effort and expense of coming, but have amply justified his retention of membership over a long period.

At the meeting, bringing together as it does men who are concerned with similar problems in the same materials fields, and with related problems on widely diverse products, there is evident an *esprit de corps* which is difficult to describe. This spirit is evident in nearly all phases of our work and is the basis of solidarity of our membership. Especially is it evident at the annual meetings.

The A.S.T.M. meetings are always working meetings, but there is nevertheless plenty of opportunity for business contacts and sociability. While these factors are difficult to emphasize appropriately in writing, almost any member who has attended an annual meeting will bear witness to their significance.

Everyone should make a special effort to attend the annual meeting. He will be well repaid. Another factor, too—these contacts and interminglings are not limited to age contacting age and youth meeting youth. There is something about the meeting which makes the youngsters and the oldsters thoroughly miscible.

G. W. Thompson on A.S.A. Board

G. W. THOMPSON, Honorary Member and Past-President of the Society, who is Chief Chemist, National Lead Co., has been elected to the Board of Directors of the American Standards Association. On invitation of the A.S.A., the Society was privileged to present a nomination and offered Mr. Thompson's name. His term began on January 1, 1938.

Chalfonte-Haddon Hall
June 27-July 1

Gift to Research Fund

THE latest gift to the Society to be added to the principal of the A.S.T.M. Research Fund is a contribution from Past-President H. F. Moore, Professor of Engineering Materials, University of Illinois, who has made an outright cash contribution to the Fund of $150. Professor Moore has long taken an active interest in the Society's research work and was first chairman of Committee E-9 on Research, serving for ten years until 1934. Also for the past ten years he has been chairman of the Research Committee on Fatigue of Metals, in addition to numerous activities on the Society's behalf in other fields.

Steps to increase the principal of the Research Fund have been undertaken by a small committee headed by Past-President F. O. Clements, General Motors Corp. Several gifts have been received and a number of members have made bequests to the Fund in their wills.

As a result of increases in the Fund, the Society has been able to assist financially in a number of investigations sponsored by its committees. There are many other projects which might very well receive support from the Fund. Doctor Clements' Committee and Committee E-9 on Research urge that any members of the Society who feel so inclined, shall assist as their means will permit in increasing the Research Fund. It has been pointed out that money contributed to the Fund will work long and effectively.

New Standards for Fuel Oils

ON the recommendation of Committee D-2 on Petroleum Products and Lubricants, the Society through its Committee on Standards has just approved a new proposed Tentative Method of Test for Sediment in Fuel Oil by Extraction and also important revisions of the Tentative Specifications for Fuel Oils (D 396 – 34 T). The test for sediment in fuel oil by extraction, designated D 473 – 38 T, is based upon a method used by the Federal Specifications Board for many years and it seemed desirable to issue it as an A.S.T.M. standardized test because it is used in one of the requirements incorporated in the proposed revisions of the fuel oil specifications.

The suggestions for improvement in the fuel oil specifications have been given consideration for some time. The changes which have been approved represent the best compromise so far reached and in the opinion of Committee D-2 the revised specifications will fit present-day needs better than those originally issued.

Any member of the Society can obtain a copy of these new tentative standards without charge on request to A.S.T.M. Headquarters.

Symposium on Plastics Published

THE six technical papers and discussion comprising the Symposium on Plastics held at the Rochester Regional Meeting in March are being published in the form of a special publication. This is expected to be available about the end of May.

Each member is receiving in a special mailing a combined prospectus and order blank, by means of which, he can conveniently order copies.

The interest in this subject was evident from the very large attendance at the technical session. The publication should be of service to those concerned with this field. The group of outstanding authorities who contributed papers discussed such topics as properties of an ideal plastic, testing methods for the determination and comparison of strength properties, methods for measuring the thermal properties, flow-relations of thermo-plastic materials, hardness and permanence of plastics.

Copies of this 56-page publication in heavy paper cover are available from A.S.T.M. Headquarters at a special price to members of fifty cents each. The list price is seventy-five cents per copy.

Nominations for Officers

THE Nominating Committee to select nominees for Society officers met in Philadelphia on March 4. The personnel of this group was listed in the March BULLETIN. In accordance with the provisions of the By-laws of the Society, the following nominations are announced:

For President:

T. G. DELBRIDGE, Manager, Research and Development Dept., The Atlantic Refining Co., Philadelphia, Pa.

For Vice-President:

W. M. BARR, Chief Chemist and Metallurgist, Union Pacific Railroad Co., Omaha, Nebr.

For Members of Executive Committee:

A. T. GOLDBECK, Engineering Director, National Crushed Stone Assn., Inc., Washington, D. C.

DEAN HARVEY, Materials Engineer, Central Material and Process Engineering Dept., Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

G. E. HOPKINS, Technical Director, Bigelow-Sanford Carpet Co., Inc., Thompsonville, Conn.

ALLEN ROGERS, Supervisor, Course in Industrial Chemical Engineering, Pratt Institute, Brooklyn, N. Y.

J. J. SHUMAN, Inspecting Engineer, Jones and Laughlin Steel Corp., Pittsburgh, Pa.

Each of the above nominees has indicated in writing his acceptance of his nomination. The By-laws provide that "further nominations, signed by at least 25 members may be submitted to the Secretary-Treasurer in writing by May 25, and a nomination so made, if accepted by the member nominated, shall be placed on the official ballot" which "shall be issued to the members between May 25 and June 1."

SOCIETY APPOINTMENTS

Announcement is made of the following Society appointments:

H. P. BIGLER, Rail Steel Bar Assn., succeeding E. E. Hughes, as one of the Society's representatives on the Joint Committee on Concrete and Reinforced Concrete.

F. E. RICHART, University of Illinois, succeeding A. N. Johnson, as Alternate on the Advisory Committee on Highway Research of the National Research Council.

C. H. SAMPLE, Bell Telephone Laboratories, Inc., succeeding the late C. L. Hippensteel, on the Joint Committee on Exposure Tests of Plating on Non-Ferrous Metals.

R. P. MILLER, Consulting Engineer, New York City, reappointed as A.S.T.M. representative on the A.S.A. Building Code Correlating Committee.

T. G. DELBRIDGE, Manager, Research and Development Dept., The Atlantic Refining Co., as the Society's representative on the A.S.A. Sectional Committee Z34 on Valid Certification.

LETTERS TO THE EDITOR

EDITOR'S NOTE.—In his "Letter to the Editor" published in the January BULLETIN (page 21), Dr. H. H. Lester raised an interesting question —namely, to just what extent should our interest lead us into research work of a fundamental nature. Quite a number of A.S.T.M. members have submitted comments on the questions raised by Doctor Lester and there are published below letters from three active and long-time members. Further discussion of this question will be welcomed.

A.S.T.M. in Basic Research

FOR the A.S.T.M. to enter the field of fundamental research would no doubt be highly desirable, but on the other hand, very costly. It seems to me that it could only be undertaken through subsidy. I have participated in a number of group gatherings to discuss this matter and have always been impressed with the fact that there were two outstanding factors involved: (1) high cost, (2) speculation as to ultimate useful information that can be profitably applied. An organization to undertake fundamental research should not have as its measure of success the valuation in dollars.

Dr. Albert Sauveur was the honored guest at a recent meeting of the Philadelphia Chapter of the American Society for Metals. The meeting was designated as Sauveur Night and the topic of Doctor Sauveur's talk was "Things We Don't Know About Steel." Subjects like that would set an exciting goal for an initial fundamental research sponsored by the A.S.T.M. Would it be possible to get a sufficient subsidy from the producers and large users of steel to undertake research in that particular field?

What applies to steel applies to many other engineering materials. Kettering in a recent speech referred to the technical libraries of the world containing the known facts in connection with engineering and engineering materials. He stated that he would like to see established a library devoted to the things that we do not now know.

If the A.S.T.M. is going to give consideration to entering the field of fundamental research, it is my suggestion that it be at least devoted to one field at the start. The above seems to me to be the logical one.

G. H. CLAMER

The Ajax Metal Co.
Philadelphia, Pa.
February 18, 1938

DOCTOR LESTER, in his letter to the editor in the December ASTM BULLETIN, has pointed to the need of having more research of the fundamental type conducted by independent agencies, such as the A.S.T.M., since these agencies are not pressed for immediate useful results, nor are they biased by any commercial interests. Most research men will agree with his point of view, and the writer believes that the A.S.T.M. should sponsor a greater amount of basic research in the future than it has done in the past.

Our Society was founded for the purpose of promoting knowledge of the properties of materials, as well as for the standardization of specifications and methods of testing. New knowledge of the properties of materials is best acquired through fundamental research, and the A.S.T.M. has a more direct interest in promoting such research than any other society. Made up as it is of producers, consumers, and general scientific and engineering groups, the Society has within itself all the elements needed for the proper selection, allocation, and sponsoring of research projects concerned with the properties of engineering materials.

Has the Society made good use of its latent ability in this field? I think not. We should have a dozen research committees, such as the Joint Research Committee on Effect of Temperature on the Properties of Metals. Many of our standing committees have sponsored important "applied research" pertaining to testing methods and specifications. This work is needed and should be continued, but, as Doctor Lester suggests, the time has come to initiate a few more well-coordinated programs of fundamental research on the properties of materials.

Standing committees should give thought to such programs in their special fields. They know the difficulties with which they are faced in their standardization work, because of the lack of knowledge on the properties of materials. Therefore, they are well qualified to plan research that will supply the missing information. These committees, also, have the industrial contacts that are needed to secure the financial support for such research.

Let us hope that more committees will follow in the footsteps of the few committees which now are sponsoring basic research.

A. C. FIELDNER

U. S. Bureau of Mines,
Washington, D. C.
February 11, 1938

IT IS interesting to read the advocacy of research as an A.S.T.M. activity, especially when one recalls the creation of the Research Committee a dozen or fifteen years ago. If I am not mistaken the motive thought at that time was closely similar to that which Dr. Lester presents, if not identical with it. The present proposal may possibly give more emphasis to the qualifying word "fundamental" but the meaning of this term is none too clear at best, and in establishing the Research Committee the Society authorities sought directly to encourage the development of new knowledge through the instrumentality of the Society.

Looking at A.S.T.M. work broadly, one may fairly say that growth of the research objective has marked the Society's life for more than a quarter-century. During that time the activities of its committees have turned more and more into research as the problems of testing and standardization grew beyond the simple harmonizing of producer and consumer views. Little of this research was of production type, and much of it may be classed as fundamental in the sense of establishing principles and relationships rather than serving immediately commercial purposes.

The question now raised is whether the Society can go much farther into pure research. It is a question well worth considering. Obviously the breadth and depth of the Society's present activities needs to be kept in mind, as well as their continuous and at times uncomfortably rapid growth. However, many recent developments indicate that the technical arts have advanced faster in the application of materials than in the materials themselves, and this fact suggests at least that there are large research opportunities in the materials field—toward better knowledge of the factors responsible for materials behavior and its variations as well as toward reduction of quality variation, improvement of quality, and better definition of service requirements, all tending to the production of new and improved materials.

I believe that the Society should continue and extend wherever possible its influence in promoting materials research both pure and applied. Where it can stimulate research within its field it clearly should do so. It might perhaps be able to encourage research or at least the dissemination of research results by establishing prizes for research papers or by establishing a special forum session, carrying farther the thought embodied in the Edgar Marburg Lecture.

Instances may occur in which the Society can serve as a research coordinating agency, and I believe that this should have due attention, though with recognition of the fact that fundamental research usually depends more on individual qualities than on coordination.

There are rather definite bounds to the Society's activities in research, since its main function lies elsewhere. If it is the primary work of the Society to develop better knowledge of material properties, methods of test, interrelation of properties, and desirable standards fitted to practical technology, this work should be kept in the foremost position. There may be risk of weakening it by turning major attention toward the quite different activity of exploration and discovery as it proceeds in the laboratory of pure science. At best scientific research can only be an incidental by-product, and it is further limited by the controlling factors of time and cost.

I might sum up these reflections by saying that the executive authorities of the Society may well give fuller thought to the question raised and seek to discover all its possibilities, while keeping in mind the necessity of maintaining the Society's essential function undiminished and undisturbed. I think it may be taken as certain that if the Society carries on in fully effective manner its service of arbitrating conflicting views on qualities and standards of materials it will bring to light constantly a sufficient number of questions calling on research for an answer to utilize all research resources at its command.

F. E. SCHMITT

Engineering News-Record,
McGraw-Hill Building,
New York City
January 27, 1938

Important Volume on Creep Data to Culminate Extensive Work

WHAT is believed will be one of the most important and valuable technical publications to have been issued is now in course of preparation under the auspices of the Joint A.S.T.M.-A.S.M.E. Research Committee on Effect of Temperature on the Properties of Metals. This compilation will provide in convenient form creep data on a great number of ferrous and a number of non-ferrous materials. The actual assembling and interpretation of the data, which cover over 300 creep tests by a number of laboratories, have been carried out as Project No. 11 of the Joint Committee's work. P. E. McKinney, Bethlehem Steel Corp., is chairman of the subcommittee and C. L. Clark, University of Michigan, is secretary.

In addition to much published data which have been correlated and assembled, the publication will give a great deal of hitherto unpublished information. A large number of the leading companies in the United States and abroad who had available important data have contributed them for inclusion in the volume. Various members of the committee have collaborated in selecting the forms used in recording the data which it is believed will be of most utility to a large number of metallurgists, designers, purchasing agents and others who will find the publication of inestimable value.

In brief, the extensive volume includes tables describing the large number of steels considered with individual charts of stress and corresponding creep rate for each type of material at each temperature and curves of temperature *versus* creep rate (0.10 per cent for 1000 hours) for each type of material wherever sufficient data were available. For *each* material reported by *each* laboratory, there is given a tabulated form. This form gives detailed description of the material including the type, its form, heat treatment, chemistry, hardness and the grain size after the McQuaid-Ehn test. In addition, there are given the impact values, initial physical properties, manufacturing data, room temperature properties of specimens after creep tests and creep characteristics. In so far as possible, there are included with the data photomicrographs showing the initial microstructure and microstructures of completed creep specimens.

The great amount of data in the publication is grouped in sections covering wrought ferrous alloys, cast ferrous alloys and non-ferrous materials. Each section is subdivided into individual types, the first section covering 24 subdivisions, the second, nine and the third, four.

Taking the wrought 0.10 to 0.20 carbon steels as an example, a table summarizes the chemical composition, heat treatment, hardness and grain size resulting from various laboratory reports, in this case 25. This is followed by figures giving the creep characteristics at 550, 800, etc., including temperature *versus* creep strength plots for killed and open steel. Then the extensive data charts, as mentioned above, are located in the publication convenient to the plots of the creep data. All told there will be over 420 charts of test data, some 270 graphs and 73 tables.

The publication is being issued jointly by the two sponsor societies and effective to June 15 a prepublication price of $10 has been set. This includes prepayment of postage in the United States and Canada only. After publication the price will be $12.

The committee is considering the desirability of issuing the material in a very substantial loose-leaf binder in preference to a bound book, with data printed on one side of the sheet. If published in this manner, the price will be increased about $2. This type of publication will have the advantage that additional data which the individual may now have in his files or data which may subsequently be supplied as a result of further work on the part of the committee can be interleaved at the appropriate places.

On the inside front cover of this BULLETIN is a detailed announcement of the publication including a return coupon.

If the publication is issued in the form of a bound volume, it is estimated it will cover about 900 pages and of course if issued in loose-leaf form (printed on one side) there would be some 900 sheets.

District Meeting in Cleveland, May 5

UNDER the auspices of the Cleveland District Committee there is to be a dinner meeting of members in the Cleveland area and their guests, at the Hotel Cleveland on Thursday evening, May 5. President A. E. White and Secretary-Treasurer Warwick are planning to attend the meeting.

The main feature is to be an illustrated talk by Inspector Cowles of the Cleveland Police Dept., who is an authority on ballistics and who has done important work in applying scientific test methods in crime detection. All members and their friends and associates are cordially invited to attend this meeting, arrangements for which are being made by Mr. H. A. Schwartz, National Malleable and Steel Castings Co., and Arthur J. Tuscany, Chairman and Secretary, respectively of the District Committee.

XIX. Long-Time Society Committee Members

Nineteenth in the Series of Notes on Long-Time Members

As a continuation of the series of articles in the ASTM BULLETIN comprising notes on the outstanding activities of long-time A.S.T.M. members, there are presented below outlines of the work of three additional members. In general the men whose activities are described in this series have been affiliated with the Society for 25 years or more and have taken part in committee work for long periods of time. No definite sequence is being followed in these articles.

A. T. Goldbeck T. R. Lawson W. C. Hanna

A. T. GOLDBECK, Engineering Director, National Crushed Stone Assn., Inc., Washington, D. C., was graduated from the University of Pennsylvania, 1906, with the degree of B.S. in Civil Engineering and later received his C.E. degree. He was Instructor at the University and also at Lafayette College, and then became Engineer of Tests for the Office of Public Roads in Washington. He was Testing Engineer for the City of Philadelphia from 1913 to 1915, and then returned to the reorganized Bureau of Public Roads and Rural Engineering as Engineer of Tests in charge of non-bituminous materials and highway engineering investigations. Later he became Chief of the Division of Tests and held this position until he became Engineering Director of the National Crushed Stone Assn., during the latter part of 1925.

Mr. Goldbeck has written many technical papers dealing with investigations of materials and on highway and bridge design and has taken an active part in the development of various laboratory apparatus including a soil pressure cell, graphic strain gage and road materials testing track.

A member of the Society since 1910, he has participated in the work of numerous committees. He was a member of Committee C-1 on Cement, 1914 to 1932, and has served on Committee D-4 on Road and Paving Materials continuously since 1913. On Committee C-9 on Concrete and Concrete Aggregates he has been particularly active, a member since it was organized in 1914, serving as secretary 1918 to 1922, and then two terms as chairman. His other committee activities include C-12 on Mortars for Unit Masonry, D-18 on Soils for Engineering Purposes and E-1 on Methods of Testing. He is one of the representatives of the A.S.T.M. on the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete.

He has been active on technical committees and in other work in a large number of organizations. He is a past chairman of the Highway Research Board and of its Committee on Design.

W. C. HANNA, Chief Chemist and Chemical Engineer, California Portland Cement Co., Colton, Calif., who was born in Leadville, Colo., began his industrial work in the laboratory of the California Portland Cement Co. in 1903. This was the pioneer cement plant of the Western United States. Mr. Hanna became Chief Chemist and Chemical Engineer of this company more than 30 years ago.

He was invited to become a member of the Society in 1905 by Prof. Edgar Marburg, then the Secretary-Treasurer. Prior to that there had been only eight members in California none of whom was in the cement field. At that time, there were about 30 cement manufacturers holding membership in the Society. Mr. Hanna indicates that of these the representatives of three are still listed in the yearbook. The first annual meeting he attended was in 1912, the Sixth International Congress for Testing Materials, with the A.S.T.M. as sponsor. Since then he has attended many annual meetings and numerous committee meetings and probably his thousands of miles of travel in attending meetings ranks him as one of the leaders in this respect.

Mr. Hanna has been particularly active in the field of cementitious materials, being a member of Committee C-7 on Lime since 1920, C-1 on Cement for over eleven years and is at present chairman of the Working Committee on Methods of Chemical Analysis. This subcommittee has a very active program under his direction. He has also been a member for several years of Committee C-9 on Concrete and Concrete Aggregates and is a member of Committee C-12 on Mortars for Unit Masonry.

Mr. Hanna is a member of a number of technical and scientific organizations including the American Institute of Chemical Engineers, American Chemical Society, American Concrete Institute and he is on the Committee on Technical Problems of the Portland Cement Assn.

It is interesting to note that from early boyhood his hobby has been the study of ornithology and in his private museum he has about twenty thousand birds' eggs. He is a member of a number of ornithological societies.

T. R. LAWSON, Head, Department of Civil Engineering, Rensselaer Polytechnic Institute, Troy, N. Y., received his elementary education in the Wheeling Public Schools and was graduated from Rensselaer Polytechnic Institute with the degree of C.E. in 1898. Since that time he has been a member of the R.P.I. faculty and has been Professor of Rational and Technical Mechanics since 1909 and Head of the Department of Civil Engineering since 1921. In addition to his teaching work, he has had a wide consulting practice involving questions of strength of materials, hydraulics, mechanics and structures.

He has been a member of the Society since 1907, was a member of the Executive Committee 1928 to 1930; Vice-President, 1932 to 1933 and President, 1933 to 1934. He has been very active on a number of committees including former Committee C-3 on Brick on which he held membership from 1911 and was chairman from 1922 to 1930. He is continuing his work on the new Committee C-15 on Manu-

factured Masonry Units, and is chairman of Subcommittee VI on Sewer Brick. He has served on Committee E-10 on Standards, chairman 1929 to 1933, and is a member of Committee E-1 on Methods of Testing.

He has been active in the work of a number of other groups including the Permanent Committee on Simplification of Varieties and Sizes of Vitrified Paving Brick, Committee on Fundamental Research in Welding of the American Welding Society and the Fatigue Committee of the National Research Council. He has prepared a number of articles and publications. Professor Lawson is a member of a number of societies including the American Society of Civil Engineers, American Welding Society, American Concrete Institute, American Association for the Advancement of Science, and is a past-president of the Clay Products Institute of America and the Society of Engineers of Eastern New York.

Cement Committee Acts at Meeting

At the meetings of Committee C-1 on Cement in Pittsburgh on March 18 and 19, consideration was given to the question of how many specifications for portland cement should be prepared by Committee C-1 and there was appointed a subcommittee, composed of non-producer members, to study this matter and present at the June meeting their recommendations as to what other specifications should be prepared and the nature of the requirements of any proposed specifications.

An important action, subject to letter ballot, involves a recommendation that the present standard for portland cement (C 9 – 37) be revised by deleting Section 1 (Definition) and adding after the table in the present Section 2 the paragraph and note which now follow the table in Section 1 of the Specifications for High-Early-Strength Portland Cement (C 74 – 36), thus covering the matter of additions up to one per cent subsequent to calcination.

There was presented a lengthy report of the recently completed cooperative study of autoclave tests by a group of laboratories on a large number of cements. Also received for study was a suggested method for autoclave tests of portland cements.

Subject to letter ballot of C-1, approval was also given to the following proposals: Revision of the present tentative standard for masonry cements (C 91 – 32 T); tentative alternate method for determining manganic oxide in portland cement; and certain minor revisions in the turbidimeter method for fineness test (C 115 – 34 T).

Lengthy consideration was given to the question of specifications for blended cements, although no specification was approved for presentation to the Society.

Interesting reports were presented on the following subjects: Cooperative studies of two methods of determining silica; current cooperative tests by a large number of laboratories on free lime determinations; comparative studies of methods for determining manganese in portland cements; studies of bleeding tests; Cement Reference Laboratory work, including the arrangements for cooperative tests of a sample of cement by 173 laboratories; new method for determining time of setting; use of different aggregates in 2-in. cube tests; and durability of cements and accelerated tests for cements.

Meeting of Timber Committee

At a meeting of Committee D-7 on Timber held in Chicago in March consideration was given to certain problems in connection with the specifications in its charge. One of the points brought out in connection with a review of the standards indicated that the value of certain standards depends on their long establishment without change. For instance, the Standard Methods of Testing Small Clear Specimens of Timber (D 143 – 27) is intended to give a base for accumulating comparable data on various species of wood over long periods and to permit international interchange of data. It provides essential details that are fundamental in obtaining the continuous accumulation of comparable data.

The question of interpretation of measuring knots, particularly in the inspection of oak piles, was discussed and the committee has requested the Forest Products Laboratory to consider the desirability of incorporating certain special rules or a clearer interpretation of the method of measuring knots in hardwoods.

L. J. Markwardt, acting secretary, in his report for the Subcommittee on Methods of Testing, told of his attendance at the London Congress of the International Association for Testing Materials on April 19 to 24, 1937, and of the meeting of an International Group at Princes Risborough to consider further work in advancing international standards on methods of testing. Two different organizations are interested in this work, namely the International Association for Testing Materials and the International Union of Forest Research Organizations. The meeting of the Subcommittee on Timber Tests of the International Union of Forest Research Organizations is being held in Helsinki (Helsingfors), Finland, August 4 to 13, 1938. In the development of international standards consideration is being given to specimens of 1 in. (2.50 m.) square cross-section.

One of the problems which the committee is to consider is the possible extension of the requirements covering structural grades of timber to include dimension stock. This is considered feasible and desirable because much dimension material is used for strength purposes.

Meeting of Committee on Mortars

Committee C-12 on Mortars for Unit Masonry, which was formally reorganized in November of last year, held a very well attended meeting in Pittsburgh on March 18. A tentative draft of proposed methods for sampling and testing of mortars had been prepared by the subcommittee on methods of test. This draft included sections on scope, sampling, proportioning of laboratory mixes, methods of mixing samples, time of set, determination of compressive strength and methods for determining consistency, water retention, soundness and volume change, staining, liability to efflorescence and water repellency. All these topics, as well as certain additional test methods such as freezing and thawing tests, were discussed. The subcommittee was instructed to prepare a revised draft of methods of test for mortars for consideration at the June meeting of Committee C-12. It was decided that no methods of test would be offered for publication as tentative until some progress had been made in developing specifications for mortar. The present plans are to publish for information a compendium of test methods for mortar.

1938 Heating and Air Conditioning Guide

THE Heating, Ventilating, Air Conditioning Guide 1938 is the 16th edition of the official reference book compiled by the American Society of Heating and Ventilating Engineers. It contains 840 pages of technical reference data included in 45 chapters covering material on design and specifications. Important new material has been added on the cooling phases of air conditioning practice, including revisions of chapters on refrigerants and air drying agents, cooling load determinations and design of central systems for cooling and dehumidifying. A chapter on air conditioning in the treatment of disease appears for the first time.

In addition to the technical material, over 300 pages of manufacturers' catalog data are included, as well as an index to modern equipment listing 300 items, cross-indexed as to product and manufacturer. A complete listing of society members, including their professional or business connections forms a separate section.

Approximately 100 different experts assisted the Guide Publication Committee of the Society in compiling this year's volume. Single copies of the Guide 1938 are available at $5.00 from the Society, 51 Madison Ave., New York City.

International Purchasing Agents' Convention

ON May 23, the National Association of Purchasing Agents, whose membership includes more than 5200 purchasing executives in all lines of industry, will meet in St. Louis, Mo., to open the Twenty-third Annual International Convention of their organization.

Four days of intensive business discussions are planned. Outstanding industrial and public leaders will participate in the program. Raymond Moley, original "brain truster," and Warren Bishop, Washington commentator; Howard Coonley and C. M. Updegraff, industrialists; Dr. Harrison E. Howe and Dr. A. A. Bates, authorities on research, and a number of purchasing executives will speak on trends in Government, business, research and industrial practices.

The Inform-a-Show, an industrial exposition, in which 70 nationally known companies will exhibit their products is held in conjunction with the purchasing agents' convention.

U. S. Industrial Research Laboratories

THE increase in the number of research laboratories maintained by industrial concerns in the United States during the last few years has made it seem desirable to issue a new edition of the National Research Council's Bulletin, "Industrial Research Laboratories of the United States." Questionnaires have been mailed to the 1562 concerns which were included in the last edition, and to a large number of new concerns which are thought to maintain laboratories. If the reader of this note is a member of a firm which maintains a laboratory where research looking toward the development and improvement of products is carried on, it is hoped that he will ascertain whether a questionnaire has been received by his company, and if not that he will request one from the Library, National Research Council, 2101 Constitution Avenue, Washington, D. C. There is no charge for the entry in the bulletin, the only requirement being that the laboratory is undertaking research.

Venezuela Establishes Federal Laboratory

A FEDERAL laboratory for the testing of all sorts of materials is being established by the Minister of Public Works, Venezuela, in Caracas. It will provide for Venezuela a laboratory functioning much as does our own National Bureau of Standards or the National Physical Laboratory of England.

This laboratory is now virtually complete and most of the equipment is installed. The majority of it has been supplied by firms in the United States, the tension-compression machine being of the Southwark-Emery type supplied through Baldwin Locomotive Works by Baldwin-Southwark Corporation, Philadelphia. Facilities have been provided for testing up to loads of 140,000 kg. (310,000 lb.) and downward to 140 kg. (310 lb.) or less, by means of two wide-table universal machines. A fine complement of tools and strain gages has also been included.

A new building, single story, of modernistic design has been built to house this equipment. Offices for personnel are provided and plans are being made for the acquisition of data on strengths and other properties of the many materials found in Venezuela. The Venezuela Sala Tecnica, Ministerio de Obras Públicas, has been a member of the Society since 1936.

Foreign Standards Recently Issued

STANDARDS issued by a number of engineering and technical organizations in foreign countries are received by the Society as they are adopted. Since members of the Society may be interested in knowing that such standards are available they will be listed as received in the ASTM BULLETIN.

Recently the following standards have been issued by the British Standards Institution:

BRITISH STANDARD SPECIFICATIONS FOR:

- Rolled Steel Bars and Hard Drawn Steel Wire for Concrete Reinforcement (No. 785 – 1938)
- Electrodes for Metal Arc Welding in the Construction of Ships (No. 782 – 1938)
- Steel Tubes and Tubulars — Gas (Light), Water (Medium) and Steam (Heavy) Qualities (No. 789 – 1938)
- Wrought Iron Tubes and Tubulars — Gas (Light), Water (Medium) and Steam (Heavy) Qualities (No. 788 – 1938)
- Wrought Iron Bars — "Special" Grade (No. 762 – 1938)
- General Grey Iron Castings — Grades A and C (No. 321 – 1938)
- High Duty Iron Castings — Grades 1, 2 and 3 (No. 786 – 1938)
- Nickel Silver Sheets and Strip of 10 to 30 per cent Nickel Content (No. 790 – 1938)
- Venetian Red for Paints (No. 370 – 1938)
- Driers for Paints:
  - Paste Driers (No. 331 – 1938)
  - Liquid Driers (No. 332 – 1938)
- Extenders for Paints:
  - Asbestine (No. 255 – 1938)
  - Barytes (No. 260 – 1938)
  - Blanc Fixe (No. 281 – 1938)
  - Silica (No. 301 – 1938)
- Japanese and/or Korean Sardine Oil (Pale) (No. 783 – 1938)
- Materials for Use in the Manufacture of Magnesium Oxychloride Flooring Compositions (No. 776 – 1938)
- Dimensions of Metal-Sheathed Paper-Insulated Plain Annealed Copper Conductors for Use in Mines, Including Voltage Tests (No. 760 – 1938)

BRITISH STANDARD METHODS FOR:

- Testing of Chemical Stoneware (No. 784 – 1938)

Provisional Program

FORTY-FIRST ANNUAL MEETING

of the

AMERICAN SOCIETY FOR TESTING MATERIALS

ATLANTIC CITY, N. J. **CHALFONTE-HADDON HALL** **JUNE 27-JULY 1, 1938**

Summary

	Morning	Afternoon	Evening
Monday, June 27	Registration Committee Meetings	Committee Meetings	Committee Meetings
Tuesday, June28	1. 10:30 a.m. Formal Opening Session	2. Water 3. Symposium on Impact Testing	4. Symposium on Impact Testing (continued)
Wednesday, June 29	5. Radiography 6. Concrete and Concrete Aggregates	7. Methods of Testing, Nomenclature 8. Edgar Marburg Lecture, 4:15 p.m.	9. Cement and Concrete 10. Effect of Temperature, Fatigue of Metals
Thursday, June 30	11. Steel, Ferro-Alloys, Corrosion 12. Bituminous Materials, Road Materials, Soils	13. Ceramic and Masonry Materials Golf Tournament	14. Iron 15. Petroleum Products, Fuels
Friday, July 1	16. Non-Ferrous Metals 17. Textiles, Paint, Plastics	No Sessions	No Sessions

Hours are given in Eastern Daylight Saving Time

Tuesday, June 28 10.30 A.M. First Session
Formal Opening Session
President's Address; Award of Honorary Memberships

Formal Opening of the Forty-first Annual Meeting. President A. E. White.

Report of Committee E-9 on Research. P. H. Bates, Chairman.

Contains a brief discussion of new research activities being undertaken or sponsored by Society Committees, and references to the work of the several research committees.

Report of Committee E-10 on Standards. Cloyd M. Chapman, Chairman.

Reports on specifications and methods of test submitted under the procedure for acceptance and publication of new and revised tentative standards and tentative revisions of existing standards in the interim between annual meetings of the Society. Reports on new standing committees organized on radiographic testing and on thermal insulating materials. Reviews standardization projects considered during the year.

Annual Report of the Executive Committee. C. L. Warwick, Secretary-Treasurer.

A general report of Society activities with particular reference to membership, publications, finances and administrative matters relating to committee activities and inter-society relations.

Annual Address by the President, A. E. White.

Award of Honorary Memberships.

Introduction of Newly Elected Officers.

The terms of the new officers, under the provisions of the By-laws, begin at the close of the annual meeting.

Miscellaneous Business.

Tuesday, June 28 2 P.M. Second Session

Held Simultaneously with Third Session

Water

Report of Joint Committee on Boiler Feedwater Studies. C. H. Fellows, Chairman.

A Method for the Embrittlement Testing of Boiler Waters. Frederick G. Straub and T. A. Bradbury, University of Illinois.

A method of testing samples of boiler water whereby embrittlement is produced in a sample of steel has been devised. This method of testing simulates boiler operation and eliminates the assumptions heretofore made. As a result of tests made on a large number of boiler water samples from boilers operating between 150 and 1400 lb. pressure, definite conclusions have been reached relative to water treatment for the prevention of embrittlement. It has been found that the presence of sodium chloride aids sodium sulfate in preventing embrittlement at pressures up to 350 lb. At steam pressures above 350 lb. sodium sulfate has practically no inhibiting action, but small amounts of aluminate are very effective in this range. Utilization of these results is being made in several power plants.

Report of Committee D-19 on Water for Industrial Uses. Max Hecht, Chairman.

The first standards to be recommended by this committee include seven complete methods for the analysis of industrial waters. These include methods of sampling plant or confined waters and analytical procedures for the following determinations:

Calcium ion and magnesium ion,
Chloride ion,
Total carbon dioxide and calculation of carbonate and bicarbonate ions,
Hydroxide ion,
Total orthophosphate and calculation of the respective orthophosphate ion, and
Sulfate ion.

The report also discusses various research activities on the development of methods for determining silica in the presence of phosphate, a hardness test of water, and the need of pH standards.

Removal of Dissolved Salts from Water by Exchange Filters. P. G. Bird, National Aluminate Corp.

This paper deals with ionic exchange bodies suitable for cation and anion exchange, of which zeolites constitute one type of cation exchange bodies. A discussion is given of commercial anion exchange bodies covering the chemistry and methods of manufacture. Some of the applications of these bodies to industrial uses are explained, together with their possibilities and limitations. The paper also discusses the mechanical equipment required in connection with the use of these exchange bodies.

The Determination of Sodium in Water Supplies by an Indirect Method. J. B. Romer, W. W. Cerna and H. F. Hannum, The Babcock & Wilcox Co.

This method of determining sodium in water is based on the principle that all inorganic basic ions present in the solids obtained on evaporating the water sample to dryness are converted, by controlled fuming with sulfuric acid, to either sulfates or oxides. With the exception of sodium, potassium and lithium, all of the anions present after this treatment can be readily and accurately determined by standard quantitative methods. A series of samples were prepared by adding various amounts of the compounds common to industrial waters. These samples were analyzed and the results show that sodium is quite accurately determined by this method.

Tuesday, June 28 2 P.M. Third Session

Held Simultaneously with Second Session

Symposium on Impact Testing

Increases in the normal speeds of machines and vehicles, insistent demands for reduction in unnecessary weight and economy in the use of materials have in the intervening years made the subject of impact failure and impact testing one of increasing importance. The development of the use of welding with its consequent discontinuity of microstructure in metals and differences in thermal treatments has initiated new and important studies of impact properties and tests. Much work has been done on the subject and numerous papers published. Differences of opinion on impact have remained strong and varied and the fundamental theory of failure has not yet been clarified.

The symposium, arranged jointly by the American Society for Testing Materials and The Engineering Foundation's Welding Research Committee, which is sponsored by The American Welding Society and the American Institute of Electrical Engineers, presents an integrated series of papers covering the basic theories underlying impact tests, data on the factors affecting impact, and papers covering the practical application of impact tests to metals, organic plastics and welds. The impact problem consists of three related effects: (1) shape or notch effects, (2) velocity effects, and (3) temperature effects. The symposium contains papers treating each effect from the standpoint of homogeneous materials and also for welds and a discussion of the basic theory underlying all three. In addition, papers are included on the practical application and utility of impact testing in the prevention of failures in use. The symposium is an authoritative review of our present knowledge on impact failures and methods of test. The symposium will be held in the Third and Fourth Sessions of the Annual Meeting and consists of the following papers:

A. Basic Theory:

The Theory of Impact Testing: Influence of Temperature, Velocity of Deformation, and Form and Size of Specimen on Work of Deformation. D. J. McAdam, Jr., National Bureau of Standards, and R. W. Clyne, American Steel Foundries.

Stress-Strain Relations Under Impact Loading. G. Dätwyler and D. S. Clark, California Institute of Technology.

Speed Effects in Tension Testing at High Speeds: The Transition Velocity. H. C. Mann, Watertown Arsenal.

B. Present-Day Uses of Impact Testing:

Utility Impact Testing. Sam Tour, Lucius Pitkin, Inc.

The Impact Strength of Plastic Materials. Robert Burns and W. W. Werring, Bell Telephone Laboratories, Inc.

Practical Application of the Notched-Bar Impact Test. G. C. Riegel and F. F. Vaughn, Caterpillar Tractor Co.

Tuesday, June 28 8 P.M. Fourth Session

Symposium on Impact Testing (continued)

C. Impact Tests on Welded Specimens:

Use of the Charpy Test as a Method of Evaluating Toughness Adjacent to Welds. Walter H. Bruckner, University of Illinois (formerly with Bureau of Engineering, U. S. Navy).

Variable Speed Tension Impact Tests on Welded Specimens. W. R. Warner, Watertown Arsenal.

Critical Review of Literature on Weld Impact Testing. W. Spraragen and G. E. Claussen, Welding Research Committee of the Engineering Foundation.

D. Summary:

Impact Testing: a Summary. S. L. Hoyt, A. O. Smith Corp.

Wednesday, June 29 9.30 A.M. Fifth Session

Held Simultaneously with Sixth Session

Radiography

Report of Committee E-7 on Radiographic Testing. H. H. Lester, Chairman.

The first report of this recently organized committee contains a correlated abstract of the literature on radiographic testing.

Radiographic Testing—Its Place in Industry. H. H. Lester, Watertown Arsenal.

The ideas that were involved in the organization of Committee E-7 on Radiographic Testing are presented, its present set-up explained, and the prospective field of its activities outlined. There is presented a résumé of the state of radiographic testing in this country and an attempt is made to present a conservative picture of its place in the metals industries.

Secondary Radiation in the Radiography of Aluminum, Steel and Lead. Herman E. Seemann, Kodak Research Laboratories.

The effect of secondary radiation upon the quality of a radiograph is one of the most serious problems in industrial radiography today. It has not been studied to any great extent under radiographic conditions. The effect is interpreted by means of a typical photographic characteristic curve and the curves which result when known amounts of secondary radiation are added to the original. Experimental results show the increase in proportion of secondary radiation recorded as thickness of the material is increased. Exposures made with and without lead screens show how much secondary radiation is removed by the lead screen. The results are compared with those which would be expected from consideration of the available data on absorption and scattering coefficients.

Quantitative Gamma-ray Radiography. Gilbert E. Doan, Lehigh University.

A Study of Intensifying Screens for Gamma-ray Radiography. Charles W. Briggs, U. S. Naval Research Laboratory, and Roy A. Gezelius, Taylor-Wharton Iron and Steel Co. (formerly with U. S. Naval Research Laboratory).

A number of different types of calcium tungstate intensifying screens were exposed to gamma rays and from the resulting film densities exposure charts were prepared. It was found that when compared to the standard lead-foil intensifying screens, the calcium tungstate screens reduce the exposure time considerably. However, the intensity does not vary according to the inverse square law and the sensitivity and definition cannot equal that which may be obtained with the lead-foil screens.

Correlated Abstracts Dealing with Radiography. Victor Hicks, Westinghouse X-ray Co., Inc.

Wednesday, June 29 9.30 A.M. Sixth Session

Held Simultaneously with Fifth Session

Concrete and Concrete Aggregates

Report of Committee C-9 on Concrete and Concrete Aggregates. R. W. Crum, Chairman.

A new method of test for yield of concrete and a method of test for soundness of aggregates by freezing and thawing are recommended for publication as tentative. In conjunction with Committee D-4 on Road and Paving Materials a new test for sieve analysis of fine and coarse aggregates is presented to replace four existing methods. A new and clarified description of the Los Angeles abrasion testing machine is included in the tentative method.

Revisions are presented of the method of test for unit weight of aggregate for concrete, and the method of test for structural strength of fine aggregate. The tentative laboratory method of making flexure tests of concrete and the test for flow of concrete are recommended for adoption as standard with some revision. The tentative revisions as published last June for the standard method of making and storing compression test specimens of concrete in the field and the standard specifications for ready-mixed concrete are recommended for adoption as standard this year.

PAPERS APPENDED:

"Stress-Strain Characteristics of Mortars and Concretes," by H. J. Gilkey and Glenn Murphy, Iowa State College.

"Some Observations on the Diffusion of Water Vapor Through Concrete," by H. J. Barre, Iowa Agricultural Experiment Station.

"Factors Affecting the Testing of Concrete Aggregate Durability," by Charles E. Wuerpel, U. S. Military Academy, West Point.

The Drying Shrinkage of Concrete as Affected by Many Factors. R. W. Carlson, Massachusetts Institute of Technology.

Test results on the contraction of concrete in air show the effect of (1) fineness and composition of cement, (2) type, gradation, and size of aggregate, (3) duration of preliminary moist curing period, (4) proportions of water, cement, and aggregate, and (5) certain admixtures.

The aggregate in concrete tends to reinforce the hydrated cement against contraction. The ability of the aggregate to restrain the hydrated cement from contracting depends upon such factors as: modulus of elasticity of the aggregate, bond between cement paste and aggregate, strength and elasticity of cement paste, and plasticity and tendency to crack of mortar between aggregate particles.

Short-Time Creep Tests of Concrete in Compression. Russell S. Jensen and Frank E. Richart, University of Illinois.

Gives results of tests made in 1936-37 at the University of Illinois as a continuation of previous studies of the effect of speed of testing on the properties of concrete. The tests were made to study the creep that occurs in concrete in compression in relatively short periods of time, varying from 1 to 30 min., and with various intensities of stress. The testing apparatus consisted of carbon pile telemeter gages for measuring loads and strains, and an oscillograph recorder. The relation between this short-time creep and that occurring over long intervals, measured in months and years, is discussed. The tests were planned to study the effect of several variables in the concrete, such as cement paste content, kind of aggregate and method of consolidation.

A Study of Fine Aggregate in Freshly Mixed Mortars and Concretes. C. A. G. Weymouth, Raymond G. Osborne Laboratories.

This paper discusses the interpretation of tests of cement mortars by the Talbot-Richart mortar-voids curves, with added curves of comparison. Three causes of voids are studied, those due to the nature of the cement paste; to "boundary effect," produced on surfaces of sand grains; and to particle interference caused by more than a critical amount in one size group of sand grading. A consistency chart makes possible the finding of water-cement ratios for concrete design from a mortar-voids chart. Practical blending of sands to give the best combined grading for concrete is explained.

Wednesday, June 29 2 P.M. Seventh Session

Methods of Testing, Nomenclature

Report of Committee E-4 on Metallography. J. T. Norton, Chairman.

Discusses briefly the progress made during the year by its subcommittees on X-ray methods, photography, and on the standard grain size chart for classification of steels.

Announces organization of new subcommittee on dilatometric analysis.

PAPERS APPENDED:

"The Plastics Mounting of Metallographic Samples," by W. L. Wyman, General Electric Co.

"The Examination of Metals in Polarized Light," by L. V. Foster, Bausch & Lomb Optical Co.

An explanatory analysis of what one can expect when examining a metal surface in polarized light constitutes the introduction to this subject. The effects produced upon polarized light transmitted by anisotropic material is briefly reviewed. Analogies are made between these results and the results of incident polarized light on metal surfaces. A new apparatus by which such examinations can be successfully carried out is described. Micrographs show the effects of examination of metal specimens in polarized light. These micrographs compare ordinary incident light examination with polarized incident light examination.

Report of Committee E-1 on Methods of Testing. W. H. Fulweiler, Chairman.

This report announces the organization of a new technical committee on laboratory glassware and thermometers to carry on the work of the former Committee D-15; also the appointment of a new technical committee on conditioning to serve in a correlative and advisory capacity to standing committees of the Society and to promote standardization in the establishment of atmospheric test conditions, including both humidity and temperature. Discusses also the activities of the present technical committees on mechanical testing, consistency and plasticity, particle size and shape, density, chemical composition, thickness measurement, interpretation and presentation of data, and designation and interpretation of numerical requirements.

PAPER APPENDED:

"Methods of Testing Thermometers," by E. F. Mueller, National Bureau of Standards, and R. M. Wilhelm, C. J. Tagliabue Manufacturing Co.

Statistical Methods as an Aid in Revising Specifications. N. C. Wiley, Bureau of Construction and Repair, Navy Dept.

The limitations and difficulties incident to the proper determination of quantitative requirements in material specifications, in order that the requirement may be mutually equitable to producer and consumer, are discussed, with particular reference to Government specifications. The methods described in the Society's "Manual on Presentation of Data" are applied to the problem.

A Level Bubble Strain Gage. Rex L. Brown, University of Illinois.

A strain gage has been devised to read with a high degree of accuracy and sensitivity very small strains over a 4-in. gage length. A level bubble is used in place of the usual dial as a measuring device. This instrument was developed and is being used for measuring strains in reinforced-concrete slabs.

Report of Committee B-4 on Electrical-Heating, Electrical-Resistance and Electric-Furnace Alloys. Dean Harvey, Chairman.

As a result of extensive investigation, a new method of test for temperature resistance constants of sheet materials for shunts and precision resistors is recommended for publication as tentative. At the request of manufacturers of radio tubes and wire the committee presents this year a new tentative method of bend test for wire used in radio tubes, incandescent lamps and for electrical resistance purposes. Revisions for immediate adoption are presented in the standard accelerated life test for metallic materials. Two new proposed methods are presented as information only covering, respectively, tests for nickel and nickel-alloy electronic tube filaments, and for cathode sleeves and tubing.

Report of Sectional Committee Z-23 on Specifications for Sieves for Testing Purposes. L. T. Work, Chairman.

This report outlines the considerations given by the committee in the preparation of revised specifications for sieves for testing purposes which cover wire-cloth sieves, round-hole and square-hole screens or sieves, and includes as information a method of calibrating woven wire-cloth sieves.

Report of Committee E-8 on Nomenclature and Definitions. Cloyd M. Chapman, Chairman.

This brief progress report discusses the work of the committee in correlating and reviewing the nomenclature and definitions in the publications of the Society.

Wednesday, June 29 4.15 P.M. Eighth Session

Edgar Marburg Lecture

The purpose of the Edgar Marburg Lecture is to have described at the annual meetings of the Society, by leaders in their respective fields, outstanding developments in the promotion of knowledge of engineering materials. Established as a means of emphasizing the importance of promoting knowledge of materials, the Lecture honors and perpetuates the memory of Edgar Marburg, first secretary of the Society.

Thirteenth Edgar Marburg Lecture: "The Torsion Test," by Dr. Albert Sauveur.

Some results obtained in the Metallurgical Laboratories in Harvard University with the use of a specialty built torsion machine are described and discussed.

The results reported include the torsional testing of various steels at room and at elevated temperatures, testing in the blue heat range, reverse twisting, and the twisting of single crystals. The significance of the autographic torque-twist curves is discussed, and a plea made for a closer study of the possibilities of the torsion test as a routine testing method comparable in usefulness and practicability to the tension test.

Award of Charles B. Dudley Medal to Robert H. Heyer, The American Rolling Mill Co.

The Twelfth Award of the Charles B. Dudley Medal will be made to R. H. Heyer, Member of the Research Department, The American Rolling Mill Co., for his paper on "Analysis of the Brinell Hardness Test," presented before the Society at the 1937 annual meeting.

Wednesday, June 29 8 P.M. Ninth Session

Held Simultaneously with Tenth Session

Cement and Concrete

Report of Committee C-13 on Concrete Pipe. E. F. Kelley, Chairman.

This report discusses the activities of the committee and its subcommittees during the year and presents revisions in the tentative specifications for concrete irrigation pipe.

Report of Joint Committee on Standard Specifications for Concrete and Reinforced Concrete. A. E. Lindau, Chairman.

Factors Influencing Bond Between Concrete and Reinforcing Steel. Raymond E. Davis, University of California.

Discusses the influence of such factors as type of cement, method of curing, temperature of curing, position of bar (horizontal or vertical), shape of bar (round or square), etc., on bond strength between concrete and reinforcing steel. Bond strength is considerably lowered when the specimens are subjected to alternations of high and low temperature within the ordinary atmospheric range. It is to a very considerable degree influenced by the type of cement and by the amount of water gain exhibited by concrete. This water gain adversely affects the bond strength more for round bars than for square bars.

Measuring Young's Modulus of Elasticity by Means of Sonic Vibrations. T. C. Powers, Portland Cement Assn.

A dynamic method of measuring Young's modulus of elasticity of a concrete or mortar specimen by determining its natural frequency of vibration is described. Data are presented comparing the moduli of elasticity obtained by this method with those obtained by static loading methods. The dynamic method is believed to give the true elastic modulus, not complicated by plastic flow.

Report of Committee C-1 on Cement. P. H. Bates, Chairman.

As a result of the committee's studies of the development and increased usage of masonry cement a complete revision of the tentative specifications and tests for this material are presented. A rapid method for the determination of manganic oxide and a test for sodium and potassium oxides are submitted. Two alternate procedures for the determination of magnesia are being recommended for adoption as standard. The definition in the standard specifications for portland cement is recommended to be deleted so that these specifications and those for high-early-strength portland cement will be in agreement; the omission of the fineness requirement in the latter standard specifications is also recommended. Revisions are submitted for inclusion in the tentative turbidimeter test for fineness of portland cement.

Appended to the main report are reports of several working committees. These cover investigations on methods of chemical analysis including several other determinations under consideration at this time; on plastic mortar tests including results of an investigation of pebble mortars by 14 laboratories; on studies of the autoclave test.

The Effect of Using a Blend of Portland and Natural Cement on the Physical Properties of Mortar and Concrete. W. F. Kellermann and D. G. Runner, U. S. Bureau of Public Roads.

Presents the results of a series of laboratory tests to determine the effect of using a blend of portland and natural cement on the physical properties of pavement concrete. In addition to the usual laboratory tests, concrete cores from pavements in New York State were subjected to alternate freezing and thawing in a calcium chloride solution as well as in plain water. The tests indicate that, although the strength of the concrete was slightly reduced by the substitution of a portion of the portland cement by natural cement, the resistance to freezing and thawing was, for certain combinations of materials, considerably increased.

Studies of the Operation of the Wagner Turbidimeter. H. S. Ponzer and D. R. MacPherson, Portland Cement Assn.

Presents a summary of data accumulated over a period of years on the operation of the Wagner turbidimeter in the Portland Cement Association Laboratory on cement samples of widely differing fineness. In addition there are included data from tests designed to study the fundamental reliability of the instrument. In the main the paper summarizes studies of various factors of operation which have been made with the object of perfecting testing technique and establishing conditions of operation which would give better concordance and reliability of results.

Wednesday, June 29 8 P.M. Tenth Session

Held Simultaneously with Ninth Session

Effect of Temperature, Fatigue of Metals

Report of Joint Research Committee of A.S.M.E. and A.S.T.M. on Effect of Temperature on the Properties of Metals. H. J. French, Chairman.

This report contains a summary of the various research projects sponsored by the committee including the investigative tests of tubes at elevated temperatures, long-time creep tests on carbon steel K20, investigations of properties of metals at low temperatures, torsion creep tests for comparison with tension creep tests, relaxation tests, and the assembly and interpretation of available creep test data.

It includes a detailed report on work carried on for the committee at Battelle Memorial Institute on the effects of manufacturing variables on high-temperature creep characteristics of steels.

The report contains a completely revised tentative method of test for long-time high-temperature tension tests.

PAPERS APPENDED:

"Progress Report on Creep Tests of Tubular Members Subjected to Internal Pressure," by F. H. Norton, Massachusetts Institute of Technology.

"Report on Long-Time Creep Test of 0.35 per cent Carbon Steel (K20)," by Howard C. Cross, and J. G. Lowther, Battelle Memorial Institute.

"Report on Acceptability Tests for High-Temperature Characteristics," by A. E. White and C. L. Clark, University of Michigan.

"Report from Project Committee 19, Covering Information on Steels for Tubular Creep Tests and Other Test Work of the Joint Committee," by H. J. Kerr, J. B. Rumer, and H. D. Newell, The Babcock & Wilcox Co.

Actual Grain Size Related to Creep Strength of Steels at Elevated Temperatures. S. H. Weaver, General Electric Co.

A statistical analysis of 32 creep tests on S.A.E. No. 4330 steel at 450 C. (842 F.) is presented. Correlation of creep stress with actual size of existing carbide grains shows an optimum grain size for the maximum creep stress. A grain larger or smaller than the optimum size gives a decreased creep stress for this steel and temperature. Changing grain size can vary creep stress 21,000 lb. per sq. in. Structure within the grain can change creep stress 4500 lb. per sq. in. Ferritic banding in visible mechanical form can lower creep stress up to 4300 lb. per sq. in.; in the "masked" or distributed form the effect of banding is negligible.

Temperature Measurement and Control in Creep Testing. P. G. McVetty, Westinghouse Electric and Manufacturing Co.

The problems involved in the design and operation of large creep testing furnaces are discussed. These include the methods used to secure uniform temperature distribution and to maintain constant temperature over long periods of time. Reference is made to features of the first large unit described before the Society last year and changes in two units installed later. Details of the temperature measuring equipment and methods are given, together with surveys to show the degree of uniformity obtained.

Report of Research Committee on Fatigue of Metals. H. F. Moore, Chairman.

This report outlines a proposed research project on the effect of type of testing machine on results of fatigue tests.

The Effect of Overstressing and Understressing in Fatigue. J. B. Kommers, University of Wisconsin.

Damage curves obtained after the application of various numbers of cycles at 10, 20, and 30 per cent overstress are shown. Results include tests on three different carbon steels and one cast iron, for both standard and square-notched specimens. The damage curves explain the effects of overstress and the changes taking place in an ordinary fatigue test. The effects of overstressing and understressing in fatigue on the static properties of materials are discussed.

An Investigation of the Effects of Elevated Temperatures on the Fatigue Properties of Two Alloy Steels. J. S. Kinney, formerly at Rensselaer Polytechnic Institute.

Partial results are given of an investigation conducted to determine the effect of elevated temperatures on the fatigue properties of two alloy steels used in the construction of steam turbines. Describes the fatigue testing machine used, which was of the rotating spring type. This machine was somewhat larger than others which have been used for the same kind of test, and differed in several respects from them. Likewise, the specimen tested was somewhat larger, and this fact presented difficulties in obtaining a suitable temperature gradient in the specimen during a test.

Recent Developments in European Research on Fatigue of Metals. Richard P. Seelig, Metal Powders Processing Co., Inc.

Thursday, June 30 9.30 A.M. Eleventh Session

Held Simultaneously with Twelfth Session

Steel, Ferro-Alloys, Corrosion

Report of Committee A-9 on Ferro-Alloys. Charles McKnight, Chairman.

Specifications for ferro-boron, ferro-titanium, and ferro-colombium alloys are presented for publication as tentative. Revision of the standard specifications for ferro-molybdenum, and for ferro-tungsten are submitted in order to bring these specifications more in line with present ideas.

Report of Committee A-1 on Steel. H. H. Morgan, Chairman.

In addition to a proposed new specification covering normalized, quenched-and-tempered alloy-steel forgings for locomotives and cars, the committee proposes the adoption as standard of existing tentative specifications covering structural nickel steel; cold-rolled strip steel; seamless cold-drawn alloy-steel, 4 to 6 per cent chromium heat-exchanger and condenser tubes, and seamless still tubes for refinery service; carbon-silicon-steel plates, chrome-manganese-silicon alloy-steel plates, and molybdenum-steel plates for boilers and other pressure vessels.

Revisions previously published as tentative are being recommended for adoption in four standards; also proposed changes are being offered for publication as tentative in quite a number of standard specifications, particularly for pipe and tubing materials, and for materials for high-temperature service.

Physical Properties of Four Low-Alloy High-Strength Steels. W. L. Collins and T. J. Dolan, University of Illinois.

Data for four low-alloy high-strength steels and one ordinary carbon structural steel, as obtained from laboratory tests of machined specimens, are presented. In addition to the determination of static properties from tests in tension, compression and torsion, tests were made to determine notch sensitivity under static, impact and repeated loads and for corrosion-fatigue strengths. Photomicrographs of corrosion-fatigue cracks and some information on the microstructure of the unstressed material as well as some data on strain hardening are also included.

Report of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys. Jerome Strauss, Chairman.

Discusses the considerations being given by the committee to the formulation of specifications for corrosion-resisting chromium-nickel alloy-steel seamless steel tubes for petroleum refinery installations and for seamless tubes for corrosion-resisting service; aso alloy-steel welded seamless tubing. The report briefly outlines the consideration being given to the preparation of a recommended procedure for an atmospheric corrosion test of stainless steels, also the inspections undertaken of stainless steel installations on the exteriors of certain large structures. Revisions in the tentative specifications for corrosion-resisting chromium-nickel sheet, strip, and plate are presented.

Surface Cracks on Large 18 per cent Chromium, 8 per cent Nickel Alloy Steel Castings. Peter R. Kosting, Watertown Arsenal.

Castings of 18 per cent chromium, 8 per cent nickel alloy steel with large cross-section are liable to have intergranular cracks starting at their surfaces and penetrating up to ⅜ in. Free machining analyses are more prone to have these cracks than regular grade. Etching is usually required to reveal the cracks. It is suggested that fine grain castings will not be prone to such cracking if cooled either quickly or very slowly, but not at an intermediate rate. The benefit of reheating and quenching such large castings from high temperatures is limited to a very thin skin which may be easily removed during fabrication.

Report of Committee A-5 on Corrosion of Iron and Steel. F. F. Farnsworth, Chairman.

New specifications for zinc-coated (galvanized) sheets are submitted as an extensive revision of the existing standard. A new method for uniformity of zinc coatings on steel castings, forgings, gray- and malleable-iron castings by the copper sulfate dip (Preece) test is presented for publication as tentative. The Preece test for uniformity of zinc coatings on wire is recommended for adoption as standard with revisions.

Failures are reported of twelve additional specimens of No. 22 gage material in the atmospheric corrosion tests after exposure at Annapolis for the past twenty-one years. Progress in the immersion tests and of the atmospheric tests on bare and galvanized sheets, and on metallic-coated hardware, structural shapes and tubular goods is also reported. An account of the work on the wire test program and of the specimens exposed at eleven test locations is presented.

Report of Committee A-6 on Magnetic Properties. Thomas Spooner, Chairman.

This progress report announces the reorganization of the committee and summarizes the work under way on direct current and on alternating current test methods. A new tentative method for testing the interlamination resistance of electrical steel is submitted to supplement the present standard methods of test for magnetic properties of iron and steel. Revisions in the standard definitions for magnetic induction, intrinsic induction and the unit for magnetic flux (Weber) are recommended so as to conform more closely to those approved by the American Standards Association.

Report of Sectional Committee B-36 on Standardization of Dimensions and Materials of Wrought-Iron and Wrought-Steel Pipe and Tubing. H. H. Morgan, Chairman.

Announces the decision of the committee to include references to three additional A.S.T.M. specifications in the American Tentative Standard for Wrought Iron and Wrought-Steel Pipe (B 36.10 – 1935) and with these changes to recommend its submission to the American Standards Association for approval as American Standard.

Thursday, June 30 9.30 A.M. Twelfth Session

Held Simultaneously with Eleventh Session

Bituminous Materials, Road Materials, Soils

Report of Committee D-4 on Road and Paving Materials. F. C. Lang, Chairman.

During the past year the committee has reviewed its numerous specifications for aggregates and tar for road construction. As a result, six new specifications for stone and slag for water-bound base and surface courses, for bituminous macadam base and surface courses, and for bituminos concrete base and surface courses, to replace twelve existing specifications, are submitted for publication as tentative. Likewise five new tentative specifications for low-consistency tar, medium-consistency tar, heavy-consistency tar, extra-heavy-consistency tar, and cut-back tar are also presented to replace eight existing specifications. A new tentative method of test for sieve analysis of fine and coarse aggregates is presented jointly with Committee C-9 on Concrete and Concrete Aggregates to replace four existing methods.

A revision is presented in the standard method of test for ductility of bituminous materials and the adoption as standard of the tentative revision in the standard test for softening point of tar products (cube-in-water method) is recommended. Proposed specifications for asphalt plank are included as information prior to their submission to the Society after the annual meeting.

Report of Committee D-8 on Bituminous Waterproofing and Roofing Materials. J. M. Weiss, Chairman.

New tentative specifications for asphalt mastic are presented covering the type of mastics consisting of asphalt cement and mineral filler and aggregate as mixed on the site of the work. Revisions are presented for inclusion in the tentative specifications for coal-tar pitch for roofing, damp-proofing and waterproofing. The report recommends that eight standard specifications for asphalt mastic and bituminous grouts be reverted to tentative with revisions in three of them. The withdrawal of the standard specifications for burlap saturated with bituminous substances for use in waterproofing is recommended.

Effect of Sulfur upon Some of the Properties of Asphalts. Isaac Bencowitz and E. S. Boe, Texas Gulf Sulphur Co.

Sulfur frequently has been associated with asphalts in its manufacture and in some of its uses. In all of these suggested processes, sulfur and asphalts are heated at high temperatures, at which a chemical reaction takes place with the liberation of hydrogen sulfide.

In this paper the properties of mixtures prepared at 300 F., without the liberation of hydrogen sulfide, are discussed. It is shown that the ring-and-ball softening point of mixtures containing sulfur does not increase as much as that of asphalts without sulfur after 1½ yr. exposure under accelerated weathering. The penetration of sulfur containing mixtures is much higher, but decreases more rapidly on aging. On remelting the original penetration is restored. Aggregate mixtures containing sulfur and asphalt exhibit a higher maximum stability at 140 F. without a corresponding increase in the brittleness at 25 to 39 F.

Report of Committee D-18 on Soils for Engineering Purposes. H. F. Clemmer, Chairman.

This report discusses the work of the committee in studying the properties and behavior of soils, and in the formulation of methods of sampling and testing soils for engineering purposes. The subcommittee on tests for stabilized soils has completed drafts of methods for determining the moisture-density relationship of soil and soil-cement mixtures, tests for durability of soil-cement mixtures by freezing and thawing and by wetting and drying, and a method for determining the swelling and shrinking of soils and treated soils.

A method of test for determining the shear of soils in service in roads is being developed, and the subcommittee on compressibility and elasticity of soils has correlated the various tests for compressibility, looking toward the development of a standard method. Revisions in several of the existing methods for testing soils have been prepared to bring the tests up-to-date.

PAPER APPENDED:

"A Study of Flocculating Agents Used in the Particle Size Determination of Soils," by E. E. Bauer, University of Illinois.

The Grading-Density Relations of Granular Materials. Donald M. Burmister, Columbia University.

An evaluation of the present state of our knowledge of soil mechanics has made us realize, in spite of the recent important advances and the practical applications in foundation work and in the construction of earth structures and highways, how incompletely this new field is developed. Certain terms, interpretations and methods of test have come into use, which must represent temporary adaptations until more significant ones can be discovered. This paper represents an attempt to bring certain physical factors into a more unified and consistent pattern by an evaluation and interpretation of the grading analysis of soils, based on physical as well as statistical considerations.

A Machine for Testing Highway Subgrade Soils. E. O. Rhodes, Koppers Co.

Highway subgrade soils are tested at the present time by empirical methods which are time-consuming and sometimes of questionable accuracy and significance. Also, several different empirical tests are used for determining the proportions of admixtures required for soil stabilization which do not always indicate correctly the amounts required for best service results.

A mechanical device, which measures consistency by means of a dynamometer, has been located which may simplify soil testing, give better reproducibility of results and furnish needed information as to the effects of admixtures. The paper describes this device, reports the results of several tests on typical soils and discusses their possible significance.

Thursday, June 30 2 P.M. Thirteenth Session

Ceramic and Masonry Materials

Report of Committee C-11 on Gypsum. L. S. Wells, Chairman.

As a result of several years' investigative work the committee presents revisions in the requirements for tensile strength of Keene's cement and in the tests for fineness and testing consistency. Since in actual practice, gypsum plasters are used in combination with sand, a revision in the requirement for the making of test briquets is recommended in the specifications for gypsum plasters. To differentiate between testing technique employed for determining the time of setting and tensile strength of unretarded plasters, plasters compounded as ready for use, and gypsum-neat plasters, a revision is recommended in these tests. The committee is also proposing the ammonium acetate method of determining the sand content of set gypsum plaster for incorporation in the general standard methods of testing gypsum.

Report of Committee C-7 on Lime. James R. Withrow, Chairman.

The report recommends the deletion of the autoclave soundness test from the tentative methods of physical test for limestone, quicklime and hydrated lime. One method and two specifications are presented as information only, namely, the rapid sugar method for the determination of available lime in high calcium quicklime and hydrated lime, and specifications for quicklime in causticizing leached liquors in the soda pulp process for the manufacture of paper, and for quicklime for use in the manufacture of paper pulp where the precipitated carbonate is employed as a pigment or filler.

Informal Report of Committee C-12 on Mortars for Unit Masonry. J. W. McBurney, Chairman.

An oral report on the activities of the committee since its reorganization and an outline of the program for the coming year.

Report of Committee C-15 on Manufactured Masonry Units. D. E. Parsons, Chairman.

Three new tentative specifications are submitted for structural clay load-bearing wall tile, for concrete units for use in the construction of catch basins and manholes, and for sand-lime building brick, the latter to replace an existing standard. A revision of the tentative specifications for paving brick is presented. Revisions in the standard specifications for structural clay non-load-bearing tile, and for structural clay floor tile are recommended.

PAPER APPENDED:

"Effect of Shape of Specimens on the Apparent Compressive Strength of Brick Masonry," by W. J. Krefeld, Columbia University.

The need for standard procedure in control tests for brick masonry is evident. This investigation deals with tests made upon 8 by 16-in. and 12 by 16-in. brick masonry piers. A total of 30 piers varying in height up to 8 ft. were tested. These tests included determination of the modulus of elasticity and compressive strength. Supplementary tests on the mortar and the physical properties of the brick used are recorded. A supplementary series of tests on 45 concrete cylinders with varying height to diameter ratios is included for comparison with the tests on masonry.

The Freezing-and-Thawing Test for Building Brick. J. W. McBurney, National Bureau of Standards.

This paper reports the effect, on the resultant disintegration of certain selected samples of brick, of certain variations in the method of making freezing and thawing tests in the laboratory. Duplicate samples were exposed to the action of weathering, using three types of exposure.

Report of Committee C-8 on Refractories. J. D. Sullivan, Chairman.

New tentative methods of test are presented for size, warpage, and bulk specific gravity of refractory brick; also a test for true specific gravity of burned refractory materials. Revisions are presented in the standard specifications for fireclay brick for malleable furnaces with removable bungs and for annealing ovens, for stationary boiler service, for marine boiler service, and refractories for the construction of incinerators. The report includes a brief summary of the work of the subcommittees during the year and discusses projects contemplated for future consideration.

Report of Committee C-14 on Glass and Glass Products. G. W. Morey, Chairman.

This first report of this new committee discusses its program of work and the consideration being given by its subcommittees on nomenclature and definitions, chemical analysis and properties of glass, also physical, mechanical and thermal properties of glass and glass products, and construction block and tile. A new method for the analysis of silica sand is submitted for publication as tentative.

Report of Committee C-4 on Clay Pipe. Anson Marston, Chairman.

This report discusses the activities of the committee and submits revisions in the specifications for clay sewer pipe.

Report of Committee C-18 on Natural Building Stones and Slate. T. I. Coe, Vice-Chairman.

Brief progress report reviewing the activities of the committee during the year.

Thursday, June 30 **Afternoon**

Golf Tournament

Thursday, June 30 **8 P.M.** **Fourteenth Session**

Held Simultaneously with Fifteenth Session

Iron

Report of Committee A-2 on Wrought Iron. J. B. Young, Chairman.

This report contains a brief account of committee activities, announces election of new officers, and recommends for immediate adoption two minor revisions in the standard specifications for welded wrought-iron pipe, and a change in the tentative specifications for rolled wrought-iron shapes and bars.

Report of Committee A-3 on Cast Iron. W. H. Rother, Chairman.

In addition to a brief summary on the activities of its various subcommittees, this report announces the organization of a new subcommittee on chilled and white iron castings, and that separate subcommittees on pressure pipe and soil pipe, respectively, will be organized. The tentative specifications for cast iron culvert pipe are recommended for adoption as standard with several changes; also a revision in the standard specifications for gray-iron castings for valves is presented for publication as tentative.

Report of Sectional Committee A-21 on Specifications for Cast-Iron Pipe and Special Castings. T. H. Wiggin, Chairman.

Effect of Size and Type of Specimen on the Torsional Properties of Cast Iron. Jasper O. Draffin and W. L. Collins, University of Illinois.

Tests were made on 48 machined specimens, 24 from each of two heats of cast iron. Specimens were solid, $\frac{3}{4}$ and 1 in. in diameter, and hollow, 1 in. outside diameter with wall thicknesses of $\frac{1}{4}$, $\frac{1}{4}$ and $\frac{1}{16}$ in. Strain measurements were made on all specimens. The properties of the iron were found to be practically the same for both diameters of the solid specimen. For the hollow specimens, the modulus of rupture and maximum unit strain were found to decrease as the wall thickness was decreased. The modulus of rupture obtained for a wall $\frac{1}{4}$ in. thick was approximately equal to the tensile strength of the cast iron when tested in direct tension.

Notes on the Hardness Measurements of Very Hard Steels and White Cast Irons. J. T. Eash and J. S. Vanick, The International Nickel Co., Inc.

Trade customs employing hardness specifications for the manufacture and purchase of very hard cast irons and steels have encountered difficulties in expecting consistent relationships between the several forms of hardness testing. The resulting difficulties led to an exploration of the hardness values obtained upon very hard test blocks of chilled alloy cast irons and correspondingly hard steels. Brinell, Scleroscope, Rockwell and Vickers tests were made. A result typical of the work shows that the actual Brinell values upon the chilled alloyed cast irons are 40 units harder than those obtained upon steels of the same Scleroscope hardness. This difference is reduced somewhat in a comparison of the Brinell with the other indentation hardness tests, such as the Rockwell and Vickers.

The Properties and Uses of Chilled Iron. S. C. Massari, Association of Manufacturers of Chilled Car Wheels.

This paper outlines the basic metallurgy of chilled iron, its technique of production and metallographic nature. Describes recent developments in the heat treatment of the metal with resulting improvements in physical properties and the properties of some of the generally used alloy chilled irons. In conclusion, the principle uses of chilled iron are discussed.

Report of Committee A-7 on Malleable Iron Castings. E. K. Smith, Chairman.

A brief informal report on the progress of the work of the committee during the past year.

Thursday, June 30 8 P.M. Fifteenth Session

Held Simultaneously with Fourteenth Session

Petroleum Products, Fuels

Report of Sectional Committee M-20 on Classification of Coals. A. C. Fieldner, Chairman.

This report contains new proposed tentative definitions for commercial varieties of bituminous and subbituminous coals which define common banded, splint, cannel, and boghead coal. The adoption as standard of the tentative method for designating the size of coal from its screen analysis is recommended, and a revision is presented for immediate adoption in the standard specifications for the classification of coals by rank.

Report of Committee D-5 on Coal and Coke. A. C. Fieldner, Chairman.

A new tentative method of sampling coals classed according to ash content is submitted which includes two distinct procedures, one for commercial sampling and the other for special purpose sampling. A revision of the procedure for determining the fusibility of ash, for inclusion in the standard methods of laboratory sampling and analysis of coal and coke, provides essential furnace requirements and details of the test procedure. It is recommended that the method of test for screen analysis of coal be adopted as standard. The report announces the organization of a new subcommittee to investigate methods for determining the ignition characteristics of solid fuels.

Report of Committee D-3 on Gaseous Fuels. A. C. Fieldner, Chairman.

This progress report discusses considerations given by the committee during the year to the standardization of test methods for gaseous fuels. It includes a résumé of activities of the seven subcommittees on collection and on measurement of gaseous samples, on calorific value of gaseous fuels, on specific gravity and density, on determination of impurities of gaseous fuels, on water vapor content, and on analysis of gaseous fuels.

Report of Committee D-2 on Petroleum Products and Lubricants. T. A. Boyd, Chairman.

New specifications for Stoddard solvent and methods of test for acid heat of gasoline, and for unsulfonated residue of plant spray oils are recommended for publication as tentative. Revisions are presented for inclusion in the tentative methods for Reid vapor pressure of petroleum products, knock characteristics of motor fuels, and the kinematic viscosity tests. It is recommended that the method of test for color of refined petroleum oil by means of the Saybolt chromometer be adopted as standard.

Revisions are presented for immediate adoption in the standard methods of test for saponification number, and in the distillation test for gas oils to make it applicable also to similar distillate fuel oils. A special procedure for light distillate oils is proposed as a tentative revision of the standard test for Conradson carbon residue. In the standard method of test for viscosity by means of the Saybolt viscosimeter, revisions published as tentative last year are proposed for adoption.

Report of Sectional Committee Z-11 on Petroleum Products and Lubricants. T. A. Boyd, Chairman.

Reports on standards being recommended for submission to the American Standards Association for approval as American standards. Progress is reported on the compilation of the summary of work in the field of petroleum products.

Some Applications of an Accelerated Test for Determining the Chemical Stability of Lubricating Greases. Frank L. Wright and H. A. Mills, Norma-Hoffmann Bearings Corp.

Discusses an oxygen absorption method which has been used successfully to predict the relative chemical stability of lubricating greases. Data are presented showing the influence of a number of interesting variables on the length of the induction period in hours. Typical oxidation curves are also presented for a variety of lubricating greases such as soda and mixed base greases (ball-bearing type), lime soap greases, aluminum soap greases, mild extreme-pressure greases and hypoid gear greases.

Report of Committee D-9 on Electrical Insulating Materials. T. Smith Taylor, Chairman.

New methods of test for arc resistance of solid electrical materials, and for acetone extraction of phenolic molded or laminated products are submitted for publication as tentative. Revisions are presented of the standard methods of testing molded materials and for pasted mica used in electrical insulation. The tentative methods of test for impact, for insulation resistance of electrical insulating materials, and for molding powders used in manufacturing molded electrical insulators are recommended for adoption as standard.

As a result of a thorough study, the committee has prepared new tentative methods for determination of the dielectric strength of solid, semi-solid, and liquid insulating materials to replace the procedures in the present methods. Revisions are presented in seven tentative methods of test on the following subjects: insulating varnishes, solid filling and treated compounds, untreated paper, sheet and plate materials, varnished cloths and tapes, laminated tubes, and flexible varnished tubing used for electrical insulation. A summary of the work of the subcommittees is included.

Studies on the Oxidation of Mineral Transformer Oil. F. M. Clark, General Electric Co., Pittsfield Works.

The lack of agreement on a test method for gaging the sludge forming properties of mineral transformer oil is attributed to the difficulty of properly controlling the oil oxidation test factors over long periods of time. A short-time, closed-container test procedure is suggested. Within the limits of test experience the method proposed gives checkable results without the introduction of chemical reactions normally absent in the commercial use of the mineral oil. The test involves a 24-hr. oxidation at higher than atmospheric pressure. The sludge results obtained are related to the sludge values for the same oils tested in accordance with the life or sludge accumulation test procedure.

Friday, July 1 9.30 A.M. Sixteenth Session

Held Simultaneously with Seventeenth Session

Non-Ferrous Metals

Report of Committee E-2 on Spectrographic Analysis. H. V. Churchill, Chairman.

This brief progress report discusses the activities of the committee during the year.

An Arc Source for Quantitative Spectral Analysis. C. J. Neuhaus, The International Nickel Co., Inc., Huntington Works.

An arc source for use with quantitative spectrographic analysis is described and illustrated. This source should prove useful where other methods such as the spark are either inapplicable or found wanting because of limitations as, for instance, the analysis time or the size of the sample available. Data are given to indicate the precision and accuracy obtained with this source in determining aluminum in Monel metal.

Report of Committee E-3 on Chemical Analysis of Metals. G. E. F. Lundell, Chairman.

This report discusses the progress made during the year in the completion of analytical methods for ferro-alloys, and in the preparation of revised procedures for the chemical analysis of non-ferrous metals and alloys.

Report of Committee B-1 on Copper and Copper Alloy Wire for Electrical Conductors. W. H. Bassett, Jr., Vice-Chairman.

Revisions in the resistivity values are presented for inclusion in the tentative specifications for hard-drawn copper alloy wires for electrical conductors. As a result of cooperative work with Committee E-1 on Methods of Testing a note on speed of testing is proposed for inclusion in four specifications.

namely, for hard-drawn and medium hard-drawn copper wire, and for copper and bronze trolley wire. In the standard specifications for bare stranded copper cable extensive changes are recommended for immediate adoption which will make this standard sufficiently inclusive to permit the withdrawal of the tentative specifications for hard-drawn copper transmission cable.

Report of Committee B-2 on Non-Ferrous Metals and Alloys. R. F. Mehl, Chairman.

Discusses the activities of its subcommittees on refined zinc, nickel, lead, tin, antimony and bismuth, white-metal alloys, precious metals, coated metals, and miscellaneous refined metals, and reports revisions in the specifications for phosphor tin, phosphor copper, silicon copper, and brazing solder.

Compressive, Impact, and Other Mechanical Properties of Nickel and Some of Its High-Strength, Corrosion-Resisting Alloys. Charles F. Catlin and W. A. Mudge, The International Nickel Co., Inc., Huntington Works.

Compressive and impact properties have been determined for nickel, Inconel, and three types of Monel metal, and have been supplemented by corresponding tensile and hardness data. The tension and torsion impact tests restrict suddenly-applied stress to a definite area and give more comparable values than standard Izod and Charpy tests. The alloys are useful for vital parts of equipment requiring high strength and resistance to corrosion. The solid-solution, or work-hardening, alloys have true elastic properties in compression ranging from 15,000 to 83,000 lb. per sq. in. Similar values for K Monel, an age-hardening alloy, are from 23,000 to 98,000 lb. per sq. in.

Report of Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys. T. S. Fuller, Chairman.

Of special importance are the results of the third inspection of twenty-four non-ferrous metals and alloys exposed since 1931 to the atmosphere at nine test locations throughout the country, which are presented in detail, including comparative data for exposure intervals of 1, 3, and 6 yrs. The extent of corrosion is reported on the basis of changes in weight of duplicate 9 by 12-in. plate specimens, by visual examination of these plates, and by the changes in the tensile strength and percentages of elongation of tension test specimens.

The work being carried on by the committee on a salt spray test, also its studies of total immersion tests, and galvanic and electrolytic corrosion are briefly discussed. Discusses work done on corosion in liquids and decision to discontinue further studies on this subject.

Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. C. H. Greenall, Chairman.

After study extending over two years new tentative specifications for commercial sheet and strip brasses are presented; also new specifications for rolled copper alloy bearing and expansion plates for bridge and other structural uses are presented as tentative, both of which replace existing specifications. The tentative specifications for bronze castings in the rough for locomotive wearing parts, and for car and tender lined journal bearings, are recommended for adoption as standard.

Revisions are submitted in the specifications for aluminum-bronze castings, for bronze castings for turntables and movable bridges, and for copper and copper-alloy seamless condenser tubes and ferrule stock. The committee recommends the withdrawal of the standard specifications for yellow brass castings and tentative specifications for sand castings (80-10-10 alloy).

Report of Committee B-6 on Die-Cast Metals and Alloys. J. R. Townsend, Chairman.

Proposes a revision of the tentative specifications for zinc-base alloy die castings by the addition of a new alloy XXV which differs in composition from the present alloy XXI in that its copper content is 1 per cent, and its physical properties are between those of alloys XXI and XXIII. A reference to the speed recommended in testing aluminum and magnesium-base die castings is proposed for inclusion in the tentative specifications.

Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. Sam Tour, Chairman.

Revisions are submitted in four tentative specifications for magnesium ingot for remelting, magnesium-base alloy sheet, magnesium-base alloy forgings, and magnesium-base alloy bars, rods and shapes. In order to incorporate minimum tensile strength requirements covering annealed plate which have been indicated as necessary for the purpose of design in boiler and pressure vessel construction, changes are recommended in the tentative specifications for aluminum sheet and plate and aluminum-manganese alloy sheet and plate.

PAPER APPENDED:

"The Effect of Foundry Variables on the Mechanical Properties of Sand-Cast Tension Test Specimens," by H. J. Rowe, Aluminum Company of America.

Report of Joint Committee on Exposure Tests of Plating on Non-Ferrous Metals. William Blum, Chairman.

Miscellaneous Business.

Friday, July 1 9.30 A.M. Seventeenth Session

Held Simultaneously with Sixteenth Session

Textiles, Paint, Plastics

Report of Committee D-12 on Soaps and Detergents. H. P. Trevithick, Chairman.

Four new tentative specifications for white floating soap, chip soap, powdered laundry soap, and laundry bar soap are presented, as well as new methods of test for particle size of soaps and detergents and for potassium and sodium oxides in soaps. The methods of chemical analysis of sulfonated oils and of analysis of special detergents, published as information last year, are submitted for publication as tentative.

The specifications for caustic soda, and modified soda (sesquicarbonate type) and the methods of sampling and chemical analysis of soaps and soap products are recommended for adoption as standard. Revisions are presented in the tentative specifications for milled toilet soap and for soda ash. New definitions of 17 terms relating to soaps and detergents are presented. A brief summary of further work now under way in the committee is included.

Report of Committee D-13 on Textile Materials. H. J. Ball, Chairman.

This report contains a number of recommendations on work accomplished during the year and includes a summary of work now under way or contemplated by the committee. Three new specifications for turkish toweling, for single-ply bleached cotton broadcloth, and for bleached wide cotton sheeting; and three new methods of test for fastness of colored textiles to light, tests and tolerances for spun rayon yarns and threads, and for yarn spun from wool mixed with fibers other than wool, respectively, are submitted for publication as tentative.

Revisions of six standards comprising specifications for textile testing machines, and methods of test and tolerances for cotton yarns and threads, cotton sewing threads, cotton goods for rubber and pyroxylin coating, woolen yarns, and worsted yarns are presented. The adoption as standard of the tentative method of test for strength of rayon fabric when wet is recommended. Revisions are presented for inclusion in the tentative definitions relating to textile materials, and the methods of testing pile floor coverings, and wool felt. Extensive changes in the standard methods of testing and tolerances for tire cord, woven and on cones, are recommended for immediate adoption. Draft of a method for the quantitative analysis of Tussah silk is presented as information.

Progress in Wool Standardization. G. E. Hopkins, Bigelow-Sanford Carpet Co., Inc.

The problems of standardization of methods of evaluating wool and wool products is outlined with discussions of the circumstances which make standardization more difficult for wool than for more recently developed materials. The need for further work on the evaluation of the wool fiber both as to its physical and its chemical characteristics is emphasized. Information on these characteristics will only be of direct use when the correlation between characteristics of the raw fiber and utility characteristics of the finished product is established.

Report of Committee D-10 on Shipping Containers. Edward Dahill, Chairman.

A progress report of the activities of the committee.

Report of Committee D-7 on Timber. Hermann von Schrenk, Chairman.

This brief progress report of the activities of the committee during the past year submits a revised description of the glass funnels used in the test for tar acids in creosote.

Report of Committee D-1 on Paint, Varnish, Lacquer and Related Products. Allen Rogers, Chairman.

This extensive report contains a number of new and revised standards completed during the year and reviews the activities of the committee and its subcommittees. The committee presents its first specification for paint which covers a grade of interior flat or eggshell finish paint. Five new specifications for pigments are included, covering respectively, aluminum pigment paste for paint, c.p. para red toner, c.p. zinc yellow (zinc chromate), titanium dioxide pigments, and zinc sulfide pigments. New methods of sampling and testing aluminum powder and aluminum paste have been developed for the testing of the materials as covered by the specifications. Revisions are submitted for seven standards comprising specifications for basic carbonate white lead, red lead, commercial para red, aluminum bronze powder for paints, normal butyl acetate (88 to 92 per cent grade), butyl propionate (90 to 93 per cent grade), and ethyl lactate (synthetic).

The committee recommends the adoption as standard of the tentative specifications for basic sulfate white lead to replace the present standard specifications, tentative specifications for blue lead, and for wood panels for weather tests of paints, and the methods of testing oleo-resinous varnishes. The results of a cooperative study of methods for analysis of cuprous oxides are presented with several recommended changes in the test method. Revisions are presented in the tentative methods of routine analysis of zinc yellow (zinc chromate yellow) and it is recommended that the standard method of test for determination of polishing lubricant in aluminum powder for paints be withdrawn.

Adherence of Organic Coatings to Metals. A. E. Schuh, Bell Telephone Laboratories, Inc.

The factors affecting the adherence of organic coatings to metals are discussed with respect to initial adherence and retention of adherence. Initial adherence is shown to depend on the chemical and physical state of the metal surface and the composition of the coating materials. Adherence retention is affected by permeability of the coatings, chemical reactions at the paint-metal interface, and physical-chemical changes occurring in the coatings, the rate and extent of which are determined by their composition, thickness of film and environmental factors during exposure.

Report of Committee D-17 on Naval Stores. F. P. Veitch, Chairman.

A brief report discussing the activities of the committee and presenting new tentative methods for sampling and grading rosin.

Some Theoretical Considerations of Rosin Crystallization. E. A. Georgi, Hercules Powder Co.

Presents the theoretical discussion of the crystallization of glasses and points out that rosin acts as a typical glass that obeys most of the laws for such materials. Various factors dealing with the composition of rosin are related to its crystallizing tendencies and the conclusions are pointed towards suggesting tests for determining the tendency of a rosin to crystallize.

Report of Committee D-11 on Rubber Products. O. M. Hayden, Chairman.

A new method of testing flat rubber belting is submitted for publication as tentative to replace the present standard methods of testing rubber belting used for power transmission. The tentative specifications and tests for friction tape for general use for electrical purposes, and for rubber insulating tape are recommended for adoption as standard. Revisions are presented in five tentative standards which include the two specifications for insulated wire and cable, Class AO 30 per cent Hevea rubber compound, and performance rubber compound; and three methods of test for rubber hose, insulated wire and cable, and the general test requirements for rubber products.

A progress report of the activities of the committee and its subcommittees is included as well as a discussion of the standard reference samples having certified abrasion properties that have been made available.

Report of Committee D-20 on Plastics. W. E. Emley, Chairman.

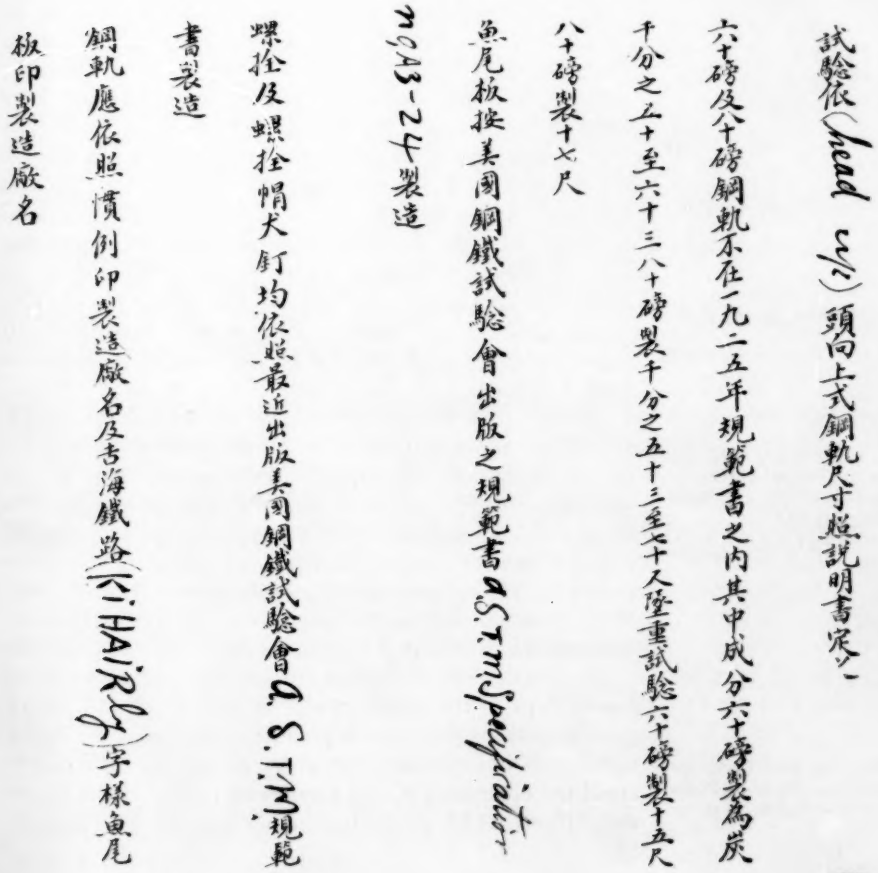
The first report of this new committee, recently organized to formulate test methods applicable to finished products in the field of plastics, discusses the consideration being given by its five subcommittees to programs of work dealing with the strength, hardness, thermal, optical, and permanence properties of plastics.

Miscellaneous Business.

A Contract— Not a Laundry Ticket

The March issue of the *U. S. Steel News* is devoted to the United States Steel Products Co., the channel through which the Corporation's products are exported. While many of the orders and contracts are expressed in English, here's one that wasn't. It's a portion of a contract between the company and the Chinese Ministry of Railways, drawn up in 1927, providing for the shipment of rails for the Kirin-Hailung Railway. Some of the terms were expressed in English. At the right (Chinese is written from top to bottom and from right to left) the words "head up" indicate the way in which the rails are to be tested. It will be noted that some of the material was to comply with A.S.T.M. Specifications A 3 – 24.

(Reprinted through courtesy U. S. Steel News).



Boiler and Other Pressure Vessel Codes

A.S.T.M. Specifications Used

THERE is great emphasis today on safety and the importance of the establishment and use of proper safeguards and safety measures. To prevent accidents on the open road, a number of highway standards have been adopted; in the factory and in the industrial plant there have been numerous safety devices, codes, and practices put into use which are serving to protect and safeguard human life.

One field of engineering construction in which the proper materials and the way in which they are used play a vital part is the construction of boilers and unfired pressure vessels. The Boiler Code Committee of the American Society of Mechanical Engineers has for over the past 25 years devoted its entire attention to the formulation of rules and regulations covering the design, selection of materials, construction, testing and inspection of power boilers, unfired pressure vessels, locomotive boilers, low-pressure heating boilers and miniature boilers. Safety is the primary purpose of these A.S.M.E. Rules.

The Code Committee devotes particular attention to the quality of the materials that it approves for use in the fabrication of the various types of vessels and boilers covered under the code. On all matters concerning standards for materials, the Code Committee looks to the A.S.T.M. for the development and formulation of the specification requirements. As the result of this cooperative arrangement, the Code Committee has approved and incorporated in the A.S.M.E. Boiler Construction Code the following 43 A.S.T.M. specifications:

A.S.T.M. Designation	Boiler Code Designation	
(A 70 – 36)	S-1	Steel Boiler Plate
(A 89 – 33)	S-2	Steel Plates of Flange and Firebox Qualities for Forge Welding
(A 31 – 36)	S-5	Boiler Rivet Steel and Rivets
(A 105 – 36)	S-8	Forged or Rolled Steel Pipe Flanges for High-Temperature Service
(A 96 – 33)	S-9	Alloy-Steel Bolting Material for High-Temperature Service
(A 18 – 30)	S-10	Carbon-Steel and Alloy-Steel Forgings
(A 27 – 36 T)	S-11	Carbon-Steel Castings (Grades A-2, A-3, B, B-1 and B-2 only)
(A 95 – 36)	S-12	Carbon-Steel Castings for Valves, Flanges and Fittings for High-Temperature Service
(A 48 – 36)	S-13	Gray-Iron Castings
(A 47 – 33)	S-15	Malleable-Iron Castings (Grade No. 35,018 only)
(A 84 – 33)	S-16	Boiler Rivet, Staybolt, and Extra-Refined Bar Iron, in substantial agreement with
(A 83 – 36)	S-17	Lap-Welded and Seamless Steel and Lap-Welded Iron Boiler Tubes
(A 53 – 36)	S-18	Welded and Seamless Steel Pipe
(A 72 – 33)	S-19	Welded Wrought-Iron Pipe
(B 11 – 33)	S-20	Copper Plates
(B 12 – 33)	S-21	Copper Bars for Staybolts
(B 13 – 33)	S-22	Seamless Copper Boiler Tubes
(B 42 – 33)	S-23	Copper Pipe
(B 43 – 33)	S-24	Brass Pipe
(A 129 – 33)	S-25	Open-Hearth Iron Plates of Flange Quality
(A 149 – 36)	S-26	High Tensile Strength Carbon-Steel Plates for Pressure Vessels (Plates 2 in. and under in Thickness)
(A 150 – 36)	S-27	High Tensile Strength Carbon-Steel Plates for Fusion-Welded Pressure Vessels (Plates over 2 in. up to and including 4 in. in Thickness)
(A 202 – 37 T)	S-28	Chrome-Manganese-Silicon (CMS) Alloy-Steel Plates for Boilers and Other Pressure Vessels
(A 178 – 37)	S-32	Electric-Resistance-Welded Steel and Open-Hearth Iron Boiler Tubes
(A 157 – 36)	S-33	Alloy-Steel Castings for Valves, Flanges and Fittings for Service at Temperatures from 750 to 1100 F.
(A 158 – 37 T)	S-34*	Seamless Alloy-Steel Pipe for Service at Temperatures from 750 to 1100 F.
(A 182 – 36)	S-35	Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for Service at Temperatures from 750 to 1100 F.
(B 96 – 36 T)	S-36	Copper-Silicon Alloy Plates and Sheets
(B 98 – 36 T)	S-37	Copper-Silicon Alloy Rods, Bars and Shapes
(B 25 – 36 T)	S-38	Aluminum Sheet and Plate
(B 79 – 36 T)	S-39	Aluminum-Manganese Alloy Sheet and Plate
(A 192 – 36 T)	S-40	Seamless Steel Boiler Tubes for High-Pressure Service
(B 61 – 36)	S-41	Steam or Valve Bronze Castings
(A 201 – 37 T)	S-42*	Carbon-Silicon Steel Plates of Ordinary Tensile Ranges for Fusion-Welded Boilers and Other Pressure Vessels
(A 203 – 37 T)	S-43*	Low-Carbon-Nickel Steel Plates for Boilers and Other Pressure Vessels
(A 204 – 37 T)	S-44*	Molybdenum-Steel Plates for Boilers and Other Pressure Vessels
(A 206 – 37 T)	S-45*	Seamless Carbon-Molybdenum Alloy-Steel Pipe for Service at Temperatures from 750 to 1000 F.
(B 62 – 36)	S-46*	Composition Brass or Ounce Metal Castings
(B 111 – 37 T)	S-47*	Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock

*These specifications have been recently approved by the Boiler Code Committee and under A.S.M.E. procedure will become effective under the Code after being formally adopted by the A.S.M.E. Council and issued in pink-colored addenda sheets.

This acceptance of such a large number of A.S.T.M. Standards under the A.S.M.E. rules and regulations for the construction of boilers and pressure vessels is of particular significance, since various sections of the Code have been adopted by 22 states, the Hawaiian Islands, and a number of municipalities throughout the United States. In a number of cases the Code has been incorporated into the state laws and city ordinances. The authorities of such states and municipalities comprise The National Board of Boiler and Pressure Vessel Inspectors whose principal function is to administer and enforce the rules of the Boiler Code. This insures uniform and strict compliance with the Code with regard to design and construction and quality of materials used.

Another code of safe practice, which provides rules for the design and construction of unfired pressure vessels for petroleum liquids and gases, has been prepared by a joint committee of the A.S.M.E. and the American Petroleum Institute. This code has been developed to provide specific requirements for the particular type of service requirements met in the gas industry and in petroleum refinery operations. Here again the materials entering into the construction of such vessels are required to comform to A.S.T.M. standards.

The installations of boilers and pressure vessels on ocean liners, ships in the merchant marine service and other navigable vessels involve hazards peculiar to the nature of marine service. It is important that every precaution be taken to avoid the occurrence of any failures or explosions in marine installations which might have disastrous results, especially

on vessels while at sea. The U. S. Department of Commerce through its Bureau of Navigation and Steamboat Inspection has formulated a comprehensive set of marine boiler rules which contain detailed specifications for the materials used in marine boilers, pressure vessels, and their appurtenances, and provisions for their design, construction and installation. The marine rules for materials include 21 specifications for ferrous and non-ferrous metals which are identical with or conform substantially to A.S.T.M. standards.

This adoption and endorsement of A.S.T.M. standards by such important regulatory bodies and authorities as the Boiler Code Committee and the Navigation and Steamboat Inspection Bureau is a further indication of the acceptability and widespread application of A.S.T.M. materials specifications.

International Testing Congress Book

THE proceedings, papers, and discussions at the London Congress of the International Association for Testing Materials held in April, 1937, have been published in a 734-page volume. The some 211 papers (printed in either English, French or German) contributed by recognized authorities from 19 countries constitute valuable additions to the literature on the testing of materials.

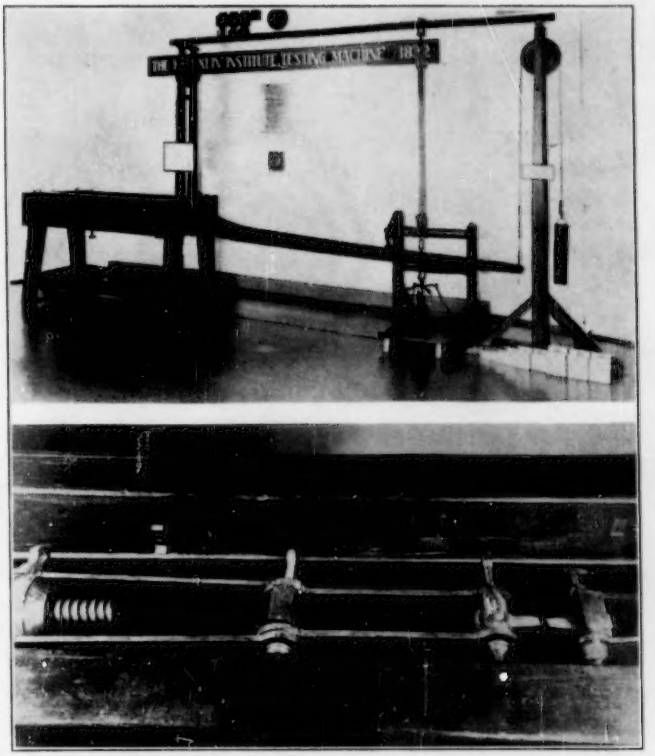
Group A on Metals contains 76 papers covering behaviour of metals (mechanical and chemical) as dependent upon temperature; progress of metallography; light metals and their alloys; and workability and wear. In Group B on Inorganic Materials, 63 papers cover a large number of topics involving concrete and reinforced concrete, several pertaining to natural stone, and a number of papers on ceramic materials.

Forty-four papers comprise Group C on Organic Materials including textiles, wood cellulose, timber preservation, aging of organic materials, and colors and varnishes. Finally there are 28 papers on Subjects of General Importance (Group D) involving relation between the results of laboratory tests and behaviour in use and service, the bearing of recent advances in physics and chemistry on the knowledge of materials, and the properties of materials for the thermal and acoustic insulation of buildings.

Copies of this extensive volume in blue cloth binding, page size, 7¼ in. by 10½ in., can be obtained from the Secretary, London Congress, International Association for Testing Materials, 28 Victoria St., London, S.W. 1, at $7.75 per copy. This includes postage to the U. S.

The Oldest Testing Machine

THE accompanying photograph shows the famous testing machine of the Franklin Institute of 1832 which is almost certainly the oldest testing machine in the world today and one of the first, if not the very first, to be made in America. With a capacity of about 25,000 lb. it is intact and in serviceable condition in the Museum of the Franklin Institute in Philadelphia. As Gibbons points out in his book,[1] it is constructed of heavy oak timbers and has a working space of 60 in. long and 14½ in. wide. The load was applied by adding weights to the scale pan and the screw was used generally only for counteracting strain.



Hundreds of tests on cast iron, wrought iron, copper and cast steel were made with this machine, and investigations on the effect of temperature were carried out with great care. Temperatures as high as 1317 F. were used, the specimens being immersed in molten tin.

Since fulcrums of the lever used were not knife edges, corrections for friction were necessary and careful tests were made to determine this factor. Also, tests were made to determine the elasticity of the frame and parts of the machine, and corrections were made on strain test results.

One of the interesting historical points in connection with the machine was that several years after its use, it apparently was dismantled and for a great many years was stored and almost forgotten in the old building of the Franklin Institute on S. Seventh St. Somebody discovered parts of the machine after many years and a search revealed that all of the parts had been saved.

[1] C. H. Gibbons, "Materials Testing Machines," Instruments Publishing Co., Pittsburgh, Pa. (1935).

Summer Programs on Strength of Materials and Spectroscopy

THE Department of Mechanical Engineering of the Massachusetts Institute of Technology is holding a summer program on Strength of Materials extending over four weeks, beginning June 13. An extensive series of lectures on timber, concrete, strength problems, and including laboratory exercises and seminars have been arranged. Further particulars can be obtained by writing Prof. J. M. Lessells, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

The M. I. T. George Eastman Research Laboratories have announced a special summer program on Spectroscopy including a conference, July 18 to 20, courses in practical spectroscopy, June 13 to 23, and research work in spectroscopy, June 1 to August 1. Information on this program may be obtained from Prof. G. R. Harrison, Department of Physics.

Standard Rubber Abrasion Compound Available

A COMPREHENSIVE cooperative research program has been carried on for several years by Committee D-11 on Rubber Products (with active work in the charge of Subcommittee XIV on Abrasion Tests for Rubber Products) to determine the feasibility of setting up one or more standard rubber compounds having certified physical properties; the compounds to be prepared by a central laboratory. The initial work was limited to abrasion resistance using the du Pont abrader.

This work has indicated definitely that it is feasible for various laboratories to correct their abrasion standards to a common standard. A wide variation in the abrasive characteristics of paper furnished by different sources discloses an urgent need for some means of maintaining a standard for the industry if laboratories should desire occasionally to compare their own results or have an occasion to make comparison with other laboratories. Committee D-11 feels that the availability of abrasion standards, offering a solution to this need, is an important accomplishment of considerable service to the rubber industry. Experience and studies with the samples during the past six months have indicated that they can be maintained within ± 5 per cent. This is considered an unusual result for a mechanical service test of this nature.

The V. L. Smithers, Inc., Laboratories of Akron, Ohio, have undertaken to supply these abrasion standards certified to have an abrasion resistance of 200 ± 5 per cent. This service is supplied on a quarterly basis for those laboratories who wish to keep their abrasion testing apparatus calibrated over extended periods of time. These samples are also available at other times and further details can be obtained from V. L. Smithers, Inc.

Rock Formation: Nature's Chemical Industry

AT A recent meeting of the American Section of the Society of Chemical Industry held jointly with the American Chemical Society, Dr. George W. Morey, Geophysical Laboratory, Carnegie Institution of Washington, showed how each of the chemical processes by which the variety of rocks and minerals have been produced in nature are prototypes of present day methods and processes used by the chemical engineer who applies them in industrial separation of minerals and ores.

In the beginning there is the homogeneous magma or molten mass. The geological process of differentiation includes the various means by which this magma separates into several portions of differing composition. Characteristic of the basic rocks are ores of chromium, nickel, and the platinum metals. Later differentiates are the rocks known as basalts and gabbros, then granites, each with its characteristic associated ore minerals.

The rock masses themselves are largely formed by fractional crystallization, with separation of the precipitated crystals from the mother liquor by gravity, a process which sometimes produces practically monomineralic deposits of great magnitude. Associated with the process of fractional crystallization, in which solids are separated from a liquid, are processes in which a vapor phase is separated from a liquid. This process is dominant in the formation of many types of ore deposits and results from the presence of volatile components in the magma.

Doctor Morey pointed out that details of this geological process may be traced in many kinds of rock and in primary deposits the world over. Thus nature teaches the chemical engineer the principles by which the various rocks and minerals are individually formed, principles which one can apply in industrial operations for the same purpose.

Doctor Morey, who is an authority on silicates and related materials, is Chairman of A.S.T.M. Committee C-14 on Glass and Glass Products.

1938 Municipal Year Book

THERE has been recently issued by the International City Managers' Association of Chicago the 1938 Municipal Year Book. This provides an authoritative résumé of activities and developments in the various fields of municipal government, involving specific events and analyses of trends in each of 24 fields of municipal activity.

There is included a directory of all the 1811 cities of over 5000 population—form of government, utilities owned, etc. Also covered are Federal-city relations in 1937, and activities of state municipal leagues. In the section on Municipal Personnel there is information on the number of city employees, salaries, etc., a directory of 12 chief city officials in cities over 10,000 in population and data on professionalization of the municipal service; also colleges offering training for public administration. Other sections cover Municipal Finance and there is an extensive portion of the book devoted to Sources of Information. One of these involves sources of standards and specifications, a number of references being given to A.S.T.M. publications. Selected books and reports issued in 1937 are listed; also selected model municipal ordinances.

Copies of this 600-page volume in cloth binding can be ordered from the Association, 850 East 58th St., Chicago, at $5.00 each.

Among interesting facts indicated in this publication are: 7000 cities are members of state municipal leagues; 130 American schools give courses in public administration; more than 60 federal agencies provide services for cities; there are more than 500 organizations with local government employees located in 38 states; approximately 600,000 persons are employed by American city governments.

Calendar of Society Meetings

(Arranged in Chronological Order)

AMERICAN FOUNDRYMEN'S ASSOCIATION—May 14-19, Cleveland, Ohio.

SOCIETY OF AUTOMOTIVE ENGINEERS—Summer Meeting, June 12-17, The Greenbrier, White Sulphur Springs, West Va.; Annual Meeting, January 9-13, 1939, Detroit, Mich.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Summer Convention, June 20-24, Washington, D. C.; Winter Convention, January 23-27, 1939, New York City.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Semi-Annual Meeting, June 20-24, St. Louis, Mo.; Annual Meeting, December 5-9, New York City.

American Society for Testing Materials—Annual Meeting, June 27-July 1, Chalfonte-Haddon Hall, Atlantic City, N. J.

SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION—Annual Meeting, June 27-30, Texas A. & M. College, College Station, Texas.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE—Summer Meeting, June, Ottawa, Canada.

AMERICAN TRANSIT ASSOCIATION—57th Annual Convention, September 19-22, Atlantic City Auditorium, Atlantic City, N. J.

Notes on Members Located in Far-Distant Lands

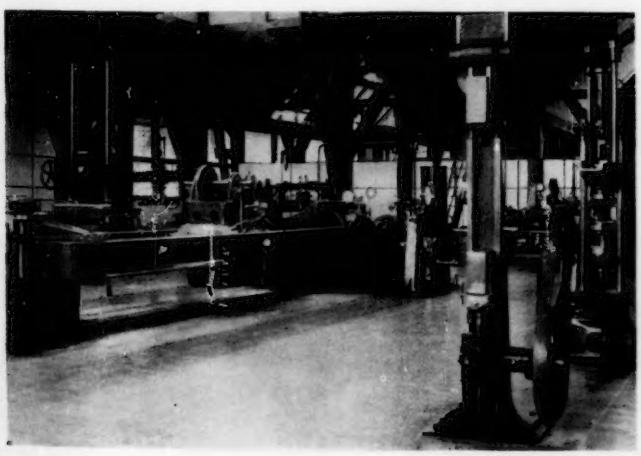
EDITOR'S NOTE.—Believing that articles and photographs relating to members of the Society who are located at far-distant points would be of interest, we asked a number of our members in various sections of the world if they would send us information which could be used in the BULLETIN. The accompanying article has resulted from the cooperation of one of our members.

THE Laboratorium voor Materiaalonderzoek, Technische Hoogeschool, Bandoeng, Java, D.E.I., has held membership in the Society since 1920. The Laboratory was established by the Netherlands-Indies Government in 1909 primarily to undertake work in the field of metals, but in 1912 its scope was extended to cover all phases of testing of materials. Later the scope was enlarged to include the carrying out of work for private concerns and now a number of activities are carried out for various organizations in the East Indies. The year 1930 was one of the most active for the testing laboratory and in that year 1350 tests and reports were prepared on various materials.

The laboratory is organized to do work in the fields of both chemical and physical testing. The chemical properties of a large number of organic and inorganic materials are investigated and in the extensive physical testing laboratories many types of construction materials undergo tests and research. The laboratory has a large number of instruments and includes a glass-blowing and instrument-making section. An important part of the Laboratory is its technical library which receives publications and journals from all over the world.

Beginning in 1926, the Laboratory has developed a number of standards pertaining to materials and has issued requirements covering various types of paints, lacquers, soap, chemicals, oils, etc. A number of publications have been issued covering items of more general interest, reports on research and testing work and the technical type of report in specific fields of work. Prof. ir. W. J. Th. Amons, who has had a period of service dating from 1922 is the present head of the Laboratory, advancing to his position in 1935 on the death of Prof. ir. W. H. A. van Alphen de Veer who directed the Laboratory for 23 years beginning in 1912.

Below:—Main Testing Room



Prof. ir. W. J. Th. Amons

Discussion Volume on Lubrication and Lubricants

THERE will be issued shortly by The American Society of Mechanical Engineers an American edition of the General Discussion on Lubrication and Lubricants which was sponsored in London late last year by the Institute of Mechanical Engineers in cooperation with 53 other societies. This new publication will comprise some 1200 pages and contain over 100 papers by leading authorities from various countries. Critical summaries of the papers and a complete report of the discussion and biographical material will be included.

The papers were planned to cover the whole field of practice and theory of lubrication and are classified as follows: Journal and Thrust Bearings, Engine Lubrication (sub-divided into internal combustion engines and reciprocating engines), Industrial Applications, and Properties and Testing.

Hydrodynamic theory, new bearings made of synthetic plastics or sintered bronze, wire drawing, the cold pressing of steel, railway or aero engine bearings, textile spindles, the choice of lubricants for different types of bearings, rock drills or mine ropes, or the correct method of lubricating ball bearings or chains are some of the subjects covered.

Copies of the book, in cloth binding, can be obtained from The American Society of Mechanical Engineers, 29 West 39th St., New York City, at $6.50 per copy.

Instrument Company Notes

THE PALMER CO., manufacturers of "Red-Reading-Mercury" Thermometers, has moved to new quarters: 2501 Norwood Ave., Cincinnati, Norwood, Ohio. The former location: 25 Clay St., St. Bernard, is being retained as a laboratory and research division, known as Plant 2. The new plant is modern in every respect, with indirect lighting for both office and factory. New equipment has been installed for the manufacture and testing of thermometers. Additional ground is owned so that the building has light on four sides.

RIEHLE TESTING MACHINE DIVISION, AMERICAN MACHINE & METALS, INC., has announced that effective April 30, its credit and collection departments will be moved to Chicago, Ill., with headquarters at 35 E. Wacker Drive. Formerly these were maintained at East Moline, Ill. C. A. Force, Credit Manager, will remain in charge of the newly located departments.

NEW MEMBERS TO APRIL 26, 1938

The following 41 members were elected from March 8 to April 26, 1938, making the total membership 4127:

Company Members (8)

CITIES SERVICE ASPHALT PRODUCTS CO., G. A. Matte, Chief Chemist, Box 128, Linden, N. J.

COORS PORCELAIN CO., H. W. Ryland, Secretary, Golden, Colo.

JOBBINS, INC., WILLIAM F., J. J. Stumm, Chief Chemist, Aurora, Ill.

NATIONAL CINDER CONCRETE PRODUCTS ASSN., A. H. Patterson, Member, 1600 Arch St., Philadelphia, Pa.

PRESSURE CASTINGS, INC., Joseph Obermayer, Chief Engineer, 21500 St. Clair Ave., Cleveland, Ohio.

SAND-LIME BRICK ASSN., Wood St., Saginaw, W. S., Mich.

STEVENS AND CO., INC., J. P., J. B. Goldberg, Laboratory Director, 14 Leonard St., New York City.

TWIN CITY TESTING AND ENGINEERING LABORATORY, 356 Cedar St., St. Paul, Minn.

Individual and Other Members (32)

AEBERSOLD, ARNOLD, National Tube Co., Inspection Dept., Lorain, Ohio.

BRITTAIN, EARLE, Chemical Engineer, The U-Need-Us Coal and Chemical Co., Painesville, Ohio. For mail: 68 Lincoln Boulevard, Painesville, Ohio.

CEDERGREN, H. N., Metallurgist, Southern Lead Co., Dallas, Tex. For mail: 111 N. Westmoreland Ave., Dallas, Tex.

DAVIDSON, EZEKIEL, Managing Director, Pretoria Portland Cement Co., Ltd., Box 3811, Johannesburg, South Africa.

DONALDSON, CLARKE, Chief of Construction, City of Atlanta, 301 City Hall, Atlanta, Ga.

FAIRBAIRN, J. MACF., Vice-President, Charles Warnock and Co., Ltd., 485 McGill St., Montreal, P. Q., Canada.

FAVILLE, F. A., President, Faville-LeVally Corp., 140 S. Dearborn St., Chicago, Ill.

FOLEY, F. B., Superintendent of Research, The Midvale Co., Nicetown, Philadelphia, Pa.

FORT WORTH, CITY OF, DEPARTMENT OF ENGINEERING, W. O. Jones, City Engineer, City Hall, Fort Worth, Tex.

HART, P. B., Textile Yarn Testing Service, 1449 St. Alexander St., Montreal, P. Q., Canada.

JARMAN, G. W., JR., Vice-President, Schori Process Corp., 110 E. Forty-second St., New York City.

KENNEDY, J. E., Manager, Engineering Sales Division, Plant Rubber and Asbestos Works, 537 Brannan St., San Francisco, Calif.

KÖLZOW, HANS, Director, Verein deutscher Ingenieure, Hermann Göringstrasse 27, Berlin, NW. 7, Germany.

LEMIEUX, B. G., Plant Engineer, The Fibre Conduit Co., Orangeburg, N. Y.

LUNN, E. G., Chief, Research Laboratory, Bureau of Engraving and Printing, Washington, D. C. For mail: 2145 C St., N. W., Washington, D. C.

MACTAGGART, E. F., Partner, Mactaggart & Evans, 14 Old Queen St., London, S. W. 1, England.

MEYERS, A. M., Chief Engineer, Kansas City Structural Steel Co., Kansas City, Kans.

MORROW, C. K., Superintendent of Inspection, National Tube Co., Ellwood City, Pa.

NEWMAN, W. R., General Superintendent, Bay Petroleum Corp., 1735 E. Sixteenth Ave., Denver, Colo.

PRESTON, G. W., General Manager, Copper Development Assn., Thames House, Millbank, London, S. W. 1, England.

REDINGTON, H. R., Secretary, Specification Committee, National Tube Co., 1719 Frick Building, Pittsburgh, Pa.

RICHARDSON, H. H., Vice-President, Aluminum Laboratories, Ltd., 59 Rue du Stand, Geneva, Switzerland.

ROBINSON, J. C., Chemical Engineer, The Mead Corp., Tannin Extract Division, Lynchburg, Va.

ROCHESTER, CITY OF, TESTING LABORATORY, H. Walter Hughes, Supervisor, 34 Court St., Rochester, N. Y.

SHANNON, W. B., Chief Assistant Constructional Engineer, London Power Co., Ltd., Ergon House, Horseferry Road, Westminster, S. W. 1, England.

SPITZGLASS, A. F., Consulting Engineer, 415 N. La Salle St., Chicago, Ill.

STEVENS, HARRISON, Metallurgical Dept., Wallingford Steel Co., Wallingford, Conn.

UNIVERSITY OF MANCHESTER, COLLEGE OF TECHNOLOGY LIBRARY, A. F. Hutt, Librarian, Sackville St., Manchester, 1, England.

UNIVERSITY OF PITTSBURGH, L. C. McCandliss, Professor of Civil Engineering, 306 State Hall, Pittsburgh, Pa.

VINCENT, C. R., JR., President, Alloy Fabricators, Inc., 8 Lister Ave., Newark, N. J.

WHITE, C. B., President, White Brothers Smelting Corp., Richmond and Hedley Sts., Philadelphia, Pa.

WYROUGH, G. J., Chief Chemist, The Whitehead Brothers Rubber Co., Trenton, N. J.

Junior Member (1)

SPIGEL, HERBERT, Architect, 315 S. Fifteenth St., Philadelphia, Pa.

NECROLOGY

We announce with regret the death of the following members and representatives:

ERNEST BATEMAN, Chemist, U. S. Forest Products Laboratory, Nakoma, Madison, Wis. Member since 1914. Mr. Bateman was a member of Committee D-7 on Timber and its subcommittees on wooden paving blocks and on timber preservatives. He also represented Committee D-7 on the subcommittees on volatility, methods for density, and determination of water of Committee E-1 on Methods of Testing and on the Joint Committee on Methods of Test for Petroleum Oils for Wood Preservation until that committee was discontinued in 1931. He had been affiliated with the Forest Products Laboratory since 1909 when it was first organized.

GILBERT D. BOYD, Vice-President, Wallingford Steel Co., Wallingford, Conn. Member since 1936. Mr. Boyd was a member of Committee A-1 on Steel and Subcommittee XIX on Sheet Steel and Steel Sheets.

GEORGE WILLIAM GRAY, Assistant Manager, Refining Dept., The Texas Company, New York City. Member since 1913. Mr. Gray held membership on Committee D-1 on Paint, Varnish, Lacquer, and Related Products, its subcommittee on paint thinners, Committee D-2 on Petroleum Products and Lubricants, subcommittee on paraffin wax, and Technical Committee A on Gasoline.

W. T. B. MCCORMACK, Chairman, Country Roads Board of Victoria, Melbourne, N. 3, Australia. Mr. McCormack represented the Board in its Society membership for several years.

JOHN NELSON OSTROM, Consulting Bridge Engineer, Chicago, Burlington & Quincy Railroad, Chicago, Ill., whose home was in East Randolph, N. Y. Member since 1903.

WILLIAM R. SCANLIN, Chief Engineer, Philadelphia Rapid Transit Co., Philadelphia, Pa. For several years Mr. Scanlin was the representative of his company in ASTM.

J. A. L. WADDELL, Consulting Engineer, Waddell & Hardesty, New York City. Member since 1896.

Folders and Literature Received

THE GAERTNER SCIENTIFIC CORP., 1201 Wrightwood Ave., Chicago, Ill. "Instruments of Precision," Catalog M 138, a 65-page catalog covering many of the Gaertner instruments including microscopes and accessories, telescopes, standard meters and scales, comparators, creep test instruments, dividing machines, and interferometers. An alphabetical index is provided.

TINIUS OLSEN TESTING MACHINE CO., 500 N. Twelfth St., Philadelphia, Pa. A 6-page folder describing the Olsen Proving Rings (with the electrically vibrated reed). Covers definitions of a proving ring, the features of the electrical vibrating reed, operation of compression rings; also the automatic-electric beam balancing unit and tension loop dynamometers—two other products of this company.

E. H. SARGENT & CO., 155 E. Superior St., Chicago, Ill. Several pamphlets covering electrometric titration assembly and electric drying oven (automatically controlled).

FISHER SCIENTIFIC CO., 711-723 Forbes St., Pittsburgh, Pa. A booklet covering Castaloy modern laboratory appliances, clamps, flexaframes, supports, hosecocks, and burette supports, etc. It is indicated that these products are made of a non-ferrous metal alloy which combines strength, corrosion resistance, appearance, etc.

LEEDS & NORTHRUP CO., 4908 Stenton Ave., Philadelphia, Pa. A folder describing the one-ohm standard, an L&N modification of the Thomas type standards developed at the National Bureau of Standards. These standards are adjusted in terms of the absolute ohm which will become effective as of January 1, 1940.

HUMBOLDT MFG. CO., 2014 N. Whipple St., Chicago, Ill. Supplementary catalog 9-C covering testing equipment for cement, concrete, aggregates, and sub-soils including testing sieves, balances, and weights, 32-pages, in heavy paper cover.

TESTING MACHINES, INC., 460 W. Thirty-fourth St., New York City. Description, in the form of a reprinted technical paper, of a new low-capacity compression testing machine (crush tester). The tester was designed especially for the testing of corrugated paper and container board. 4 pages.